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Bird species inventory in secondary tropical montane cloud forest at Cloudbridge Nature Reserve, Talamanca Mountains, Costa Rica

Jennifer R. Powell[1*], Jonathan P. Slifkin[2], Frank T. Spooner[3], Jeffrey Roth[4], Laurie Allnatt[5], Ryan Andrews[6], Matt Smokoska[7]

1 Cloudbridge Nature Reserve, San Gerardo de Rivas, Pérez Zeledón, Costa Rica • JRP: jennifer.powell@mail.utoronto.ca https://orcid.org/0000-0002-0848-3364

2 Canopy Family, Panamá City, Republic of Panamá • JPS: jpslifkin@gmail.com

3 Independent researcher, Camberley, Surrey, United Kingdom

4 Angelo State University, Department of Biology, San Angelo, TX, USA • JR: jroth1@angelo.edu

5 Independent researcher, Exeter, Devon, United Kingdom

6 University of Kansas, Department of Biology, Lawrence, KS, USA

7 The Davey Tree Expert Company, Auburn Hills, MI, USA

* Corresponding author

Abstract

The tropical montane cloud forests (TMCF) of the Talamanca Mountains of Costa Rica are a unique and understudied habitat that is home to a high number of endemic bird species. Cloudbridge Nature Reserve is a TMCF reforestation reserve lying on the Pacific slope of Cerro Chirripó in the cantón of Pérez Zeledón. Here, we synthesize data collected at Cloudbridge between March 2016 and May 2020 from multi-year point count, walking, call-playback, and camera trap surveys along with photographs collected from February 2007 to April 2021 to present a bird species inventory of the reserve. In total, 204 bird species from 40 families, including 40 endemic species, were identified, and monthly presence summarized for each species. We discuss the implications of our findings for understanding TMCF avian communities, as well as the importance of year-round surveys using a variety of techniques to better capture overall avian diversity.

Keywords

Avian, endemic, point count, camera trap, regenerating forest

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Introduction

Costa Rica, a small country accounting for only 0.03% of the world's surface, is home to approximately 4.5% of the world's described biodiversity and is considered one of the most species dense countries in the world (Kohlmann 2011). Within Costa Rica, the Talamanca Mountains contain the greatest concentration of endemic species compared to the other humid montane forests of Mesoamerica (Hernández-Baños et al. 1995) and are home to four of

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the six Endemic Bird Areas (EBAs) identified in the country (BirdLife International 2019). This includes the Costa Rica and Panamá Highlands EBA (1000 m a.s.l. to the mountain tops), which is home to eight endemic bird genera and includes regions of increasingly scarce cloud forest habitat (BirdLife International 2020).

Tropical montane cloud forests (TMCF) are unique ecosystems estimated to make up around 2.5% of all tropical forests globally and 1.2% of tropical forests in the Americas (Bubb et al. 2004). TMCFs are biologically rich and tend to support high concentrations of endemic species (Hernández-Baños et al. 1995). The defining characteristic of TMCFs is "persistent cloud cover/fog at the vegetation or ground level that ensures that the tree crowns are regularly in contact with cloud water," which is an essential source of moisture for the organisms within these forests (Ray 2013). Their location on mountain tops and dependence upon persistent cloud cover makes TMCFs particularly vulnerable to the effects of climate change as meteorological changes can shift the cloud base up or off these mountains (Bubb et al. 2004; Ray 2013).

Beyond the threat of climate change, the historic extent of TMCFs has diminished through widespread deforestation. In the 1960s and '70s, around 50% of Costa Rica's primary forest cover, including TMCFs, was cleared to create employment opportunities to help support a population boom (Rosero-Bixby and Palloni 1998). Despite forest cover falling to as low as 26% in the early 1980s, by 2011 reforestation efforts increased forest cover back to around 52% (Blasiak 2011), although most of those forests now exist in a secondary condition.

Inventorying many areas across the Talamanca Mountains is important to capture the full picture of bird diversity in the region and the TMCFs contained within. Despite higher elevation areas having a lower overall species richness (Blake and Loiselle 2000; Jankowski and Rabenold 2007), studies in these areas are particularly valuable due to the high concentration of endemic species (Garrigues et al. 2020a). Long-term monitoring is also important in this respect, as endemic montane bird species generally have narrow and patchy range distributions and often occur at low densities (Jankowski and Rabenold 2007), making many species difficult to detect even when present. In addition, as most endemics in the region show a preference for forested habitat (Oostra et al. 2008), monitoring areas undergoing reforestation allows for a better understanding of the usage of secondary forest by these unique species.

This paper synthesizes the results of several multi-year bird monitoring studies conducted in Cloudbridge Nature Reserve (Cloudbridge) as well as verifiable incidental observations to provide a bird species inventory for the reserve. Cloudbridge is a TMCF reforestation reserve in the Talamanca Mountains, on the slopes of Cerro Chirripó, the tallest peak in Costa Rica. The reserve is focused on restoring degraded land previously used for cattle and vegetable farming, as well as studying the effects of reforestation on the local flora and fauna. Inventorying birds in the reserve provides valuable information on the birds utilizing secondary TMCF habitat and helps to document bird presence and distribution in an understudied area with high avian diversity and endemism.

Study Area

Cloudbridge Nature Reserve is a 255 ha, TMCF reforestation reserve on the Pacific slope of the Talamanca Mountains in Costa Rica. Holdridge Life Zone classifications (Holdridge 1967) for the area are primarily Lower Montane Wet Forest, with some areas of Lower Montane Rain Forest (Quesada-Monge 2007). The reserve lies between 1500–2600 m a.s.l., with most biological surveys conducted between 1500–2200 m a.s.l. It is located 2 km from the village of San Gerardo de Rivas, and 18 km northeast of San Isidro del General in the cantón of Pérez Zeledón (Fig. 1). The reserve shares its eastern border with the Parque Nacional Chirripó and its northern and part of its western border with a private nature reserve. Its other borders are shared with pastureland or private forest. Two rivers run through the reserve, Río Chirripó Pacífico and Río Urán. There are two main seasons, dry and wet, with the dry season occurring from the later part of December through the early part of April. In the peak dry season (January–March), total rainfall is about 113 mm, while in the wet season (April–December), total rainfall is about 2470 mm and rain occurs almost daily. Throughout the year, the reserve is blanketed in fog for at least part of every day. Temperatures are fairly stable, with year-round average daily temperatures fluctuating only about 3 °C, from 16–19 °C. Typical daily temperatures range from 13–27 °C (AYA 2019).

The reserve is composed of 227 ha of reforested pasture and farmland, and 28 ha of primary forest (montane oak forest), as well as a small area of inhabited land in the lowest corner of the reserve. The secondary forest areas can be divided into natural regeneration and planted areas. The natural regeneration areas were left to regrow without human intervention and can be further divided into areas of older natural regeneration (29–34 years) and younger natural regeneration (12–18 years). Areas that showed no or minimal natural tree regrowth were planted with native species primarily grown in an onsite nursery from seeds or saplings gathered in the primary and natural regeneration areas. The planted areas vary in age from 10–18 years. In 2018–2019, for trees greater than 10 cm in diameter, older natural regeneration areas had an average tree height of 13.4 m, younger natural regeneration areas an average of 12.8 m, planted areas an average of 11.1 m, and primary areas 14.6 m. The primary forest is largely restricted to the highest elevations in the reserve, with the older natural regeneration in a band below the primary forest and in patches in the west of the reserve. The planted and younger natural regeneration areas exist in a patchwork in the lower

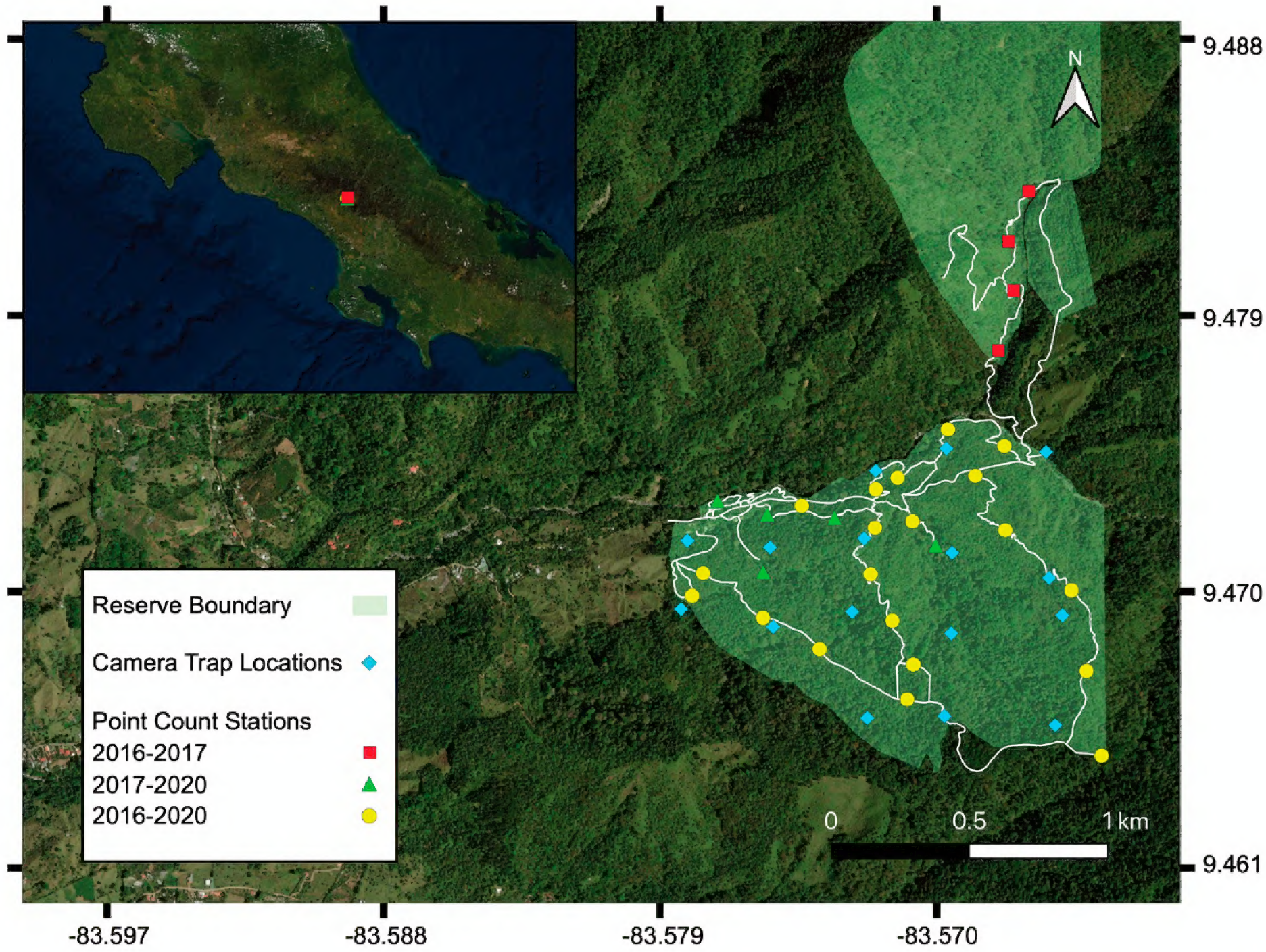

Figure 1. Cloudbridge Nature Reserve, San Gerardo de Rivas, Talamanca Mountains, Pacific Slope. Symbols represent point count and camera trap locations while lines show walking surveys routes.

elevations and close to the rivers. Habitat types for each survey site and trail are provided in Supplemental Table S206.

Methods

Data collection. Bird presence was determined from several data sources, including: 1) point count monitoring, 2) walking surveys, 3) owl call-playback surveys, 4) camera trap images, and 5) photographs. GPS coordinates and altitude ranges for all survey locations are provided in Supplemental Table S206.

Point count monitoring. The bulk of the data was collected as part of a long-term monitoring study beginning on 14 March 2016 and continuing to 29 May 2020 with some gaps in data collection due to a lack of field staff, including: June–July 2016, March–June 2017, September–December 2018, and January 2019.

From March 2016 to October 2017, point counts were conducted at 24 sites (Fig. 1, circles and squares). In October 2017, tropical storm Nate caused severe flooding along the rivers ending reliable access to the 4 northern point count sites (Fig. 1, squares) after that date. After 15 December 2017, five replacement sites were added in the southern part of the reserve (Fig. 1, triangles) and sampling continued until 29 May 2020 only at the 25 point count sites in the southern part of the reserve (Fig. 1, circles and triangles).

Four or 5 sites were surveyed each day starting at 06:00 and finishing between 09:00 and 10:00, with all sites surveyed once a week. Daily site survey order was reversed weekly to help prevent temporal bias. Point counts lasted 20 min, conducted by one or two observers (typically two). Within a 25 m radius of a fixed marker, from the ground to the top of the canopy, all birds utilizing the habitat were identified and recorded. Visual identifications were prioritized due to training difficulties (see training section), but audio identifications were also recorded and the type of identification noted. Audio identifications were only included in this inventory when the species was also confirmed by visual identification. Birds seen soaring in the area or transiting the site were also identified but during periods of high volume were less of a priority to record. A total of 3440 point count surveys were conducted.

Walking surveys. Walking surveys were conducted in conjunction with both the point count monitoring study (14 March 2016 to 29 May 2020) and a study on mixed species feeding flocks (MSF) (12 February to 19 June 2019). Walking surveys were conducted along all the trails of the reserve (Fig. 1, lines), including those not

covered by the point count surveys, and were particularly important for surveying the northern part of the reserve where access was too unreliable for regular sampling after October 2017.

During the point count monitoring study, walking surveys were conducted on alternating days for a total of five surveys every two weeks. Walking surveys occurred in between point count sites and continued after point counts had been completed. They started at 06:00 and finished at 12:00. During the MSF study, walking surveys were conducted each weekday along four routes covering most of the reserve beginning at 06:00 and lasting 3–4 h. Species were tallied for specific segments of the trails being walked. A total of 267 walking surveys were conducted for the monitoring study and 80 for the MSF study.

Owl call-playback surveys. Owl species were surveyed using call-playback between March 2016 and January 2020 with data collection gaps including: March–April, June–July, and October–December in 2017; January and July in 2018; and May and September–October in 2019. Costa Rican Pygmy Owl (*Glaucidium costaricanum*), Unspotted Saw-whet Owl (*Aegolius ridgwayi*), Tropical Screech-Owl (*Megascops choliba*), Bare-shanked Screech-Owl (*Megascops clarkii*), and Mottled Owl (*Ciccaba virgata*) were included in the study based on previous study results (Paradis 2007) and known Costa Rican owl ranges. Striped Owl (*Asio clamator*) was added in April 2016 after one was observed in the reserve. Owl surveys were conducted at the same 24 locations as the point counts (Fig. 1, circles and squares), with the exception of the five sites added in 2017. The four northern sites (Fig. 1, squares) were dropped in October 2017 due to loss of access, leaving 20 survey sites. A total of 625 surveys were conducted, with all but the first 24 surveyed for all six owl species.

Call-playback surveys started at 18:30 and were completed by 00:00. Five sites were surveyed each evening, and each site was only surveyed once a month to prevent habituation to the calls (Harris and Haskell 2013). Surveys began with 3 min of silence, followed by a 2-min playback, repeated until all owl calls had been played in order of smallest owl to largest (Braga and Motta-Junior 2009), finishing with 3 min of silence.

Playbacks were composed of a mixture of alarm and song calls downloaded from Xeno-Canto (Xeno-Canto Foundation 2005–2019). Recordings used included: Costa Rican Pygmy Owl (Athanas 2005; Spencer 2011a, 2011b), Unspotted Saw-whet Owl (Nelson 2014b), Tropical Screech-Owl (Noernberg 2011; Chaves 2015), Bare-shanked Screech-Owl (Lane 2001a; Spencer 2009), Mottled Owl (Boesman 2010; Nelson 2014a), and Striped Owl (Lane 2001b; Ramírez 2014).

Camera trap images. Bird records were supplemented by camera trap images collected in the reserve. Most camera trap data was collected between 13 May 2019 and 21 May 2020 along a grid of 16 locations spaced approximately 300 m apart throughout the reserve, some near the trail system, but most at more remote locations (Fig. 1, diamonds). As data from the camera trap study was not fully processed at the time of writing, it was only used to supplement monthly presence data for some species. Additional camera trap images from recreational cameras were available prior to May 2019, and were sometimes used as voucher photos, but not used for presence data.

Photographs. Photographs taken either during or outside of surveys were obtained from staff, interns, researchers, volunteers, and visitors. In addition to serving as records of species presence, these photos were used as voucher photos for the identified species. Location and date were confirmed for each photo, ranging from 23 February 2007 to 25 April 2021. Photographs taken outside of surveys were added as unique records to the species record tables in the supplementary material.

Training. All field crew for point count and walking surveys were trained on site for 2–3 weeks and were required to pass a visual bird identification test prior to beginning surveys. Each test consisted of 30 images, each shown for 15–45 seconds, of a different random selection of species that had been identified in or near the reserve or were potentially present in the area (approximately 300 species). Testing was repeated until a passing grade of 28/30 correct identifications was reached.

Audio identification was not tested due to the difficulty of training accurate bird song identification skills for 300 species in short-term field crew (typically 2–3 month periods). As such, visual identification was prioritized in order to have a higher degree of confidence in the accuracy of the resulting identifications.

Records. All records are included in the supplementary material, divided by species. For each record, study (monitoring, MSF, owl, or camera trap, if applicable), record type (point count, walking, call-playback, camera trap, or photograph), GPS coordinates, elevation, date, and observers are provided. For point count, call-playback, and camera trap records, the GPS coordinates and elevation of the collection station are provided. For walking surveys, the northern, eastern, southern, and western GPS coordinates and altitude range of the trail segment where the bird was recorded are provided. For photographs taken during surveys, the figure number is provided next to the associated survey record. For photographs taken outside of surveys, a unique record was created listing the record type, GPS coordinates, elevation, date, photographer, and figure number.

Species identification. As no voucher specimens were collected in the reserve, species were only included in this inventory if a clear voucher photo or camera trap image showing the main identification features of the species was taken within or immediately adjacent to the reserve (Figs. 2–15). In one case, an audio record was obtained and used to confirm a visual identification; the file was uploaded to the Macaulay Library at the Cornell

Lab of Ornithology (Macaulay Library 2021) and the reference number included in the species annotation.

Garrigues and Dean (2014) was used for field identification, while *Handbook of the Birds of the World Alive* (del Hoyo et al. 2019) and *Birds of the World* (Billerman et al. 2020) were used to confirm identifications. Other resources included *A Guide to the Birds of Costa Rica* (Stiles and Skutch 1989) and *All About Birds* (Cornell Lab of Ornithology 2019). Taxonomy and nomenclature followed *The eBird/Clements Checklist of Birds of the World* (Clements et al. 2019), while the Asociación Ornitológica de Costa Rica's *Lista Oficial de Aves Endémicas Para Costa Rica y la Región* (Garrigues et al. 2020a) provided the status of endemic species in Costa Rica, supplemented by range information from Billerman et al. (2020) and Garrigues and Dean (2014).

Species status. A species was considered a resident (R) in or a migrant (M) to the reserve (as determined using Garrigues et al. 2020b), if it was recorded a minimum of three consecutive years since its first identification, or during all but one survey year. Otherwise, a species was considered an occasional (O) visitor to the reserve if there were gaps in its yearly presence since its first identification, or accidental (A) if only recorded in a single year. Species status, total number of records, record types, and yearly presence is summarized in Table 1.

Monthly presence. Data from point count, walking, and call-playback surveys was combined to determine monthly presence by calculating the percentage of total survey days on which a species was recorded. If multiple surveys recorded a species on the same day, that counted as a single day of presence. Designations include: very common (V), >75% of survey days (s.d.); common (C), 50–75% of s.d.; fairly common (F), 25–50% of s.d.; uncommon (U), 5–25% of s.d.; and rare (R), >0–5% of s.d. If photographs or camera trap images were available for a month with no survey records, this was recorded with a "P" or a "T", respectively. Monthly presence is summarized in Supplemental Table S207.

Data Resources

The data underpinning the analysis reported in this paper are deposited at GBIF, the Global Biodiversity Information Facility, and are available at https://ipt.pensoft.net/resource?r=cloudbridge_bird_records_costa_rica.

Results

A total of 204 bird species from 40 families were confirmed by photographs and survey records within the reserve (Table 1; Figs. 2–15). Residents and yearly migrants that were recorded every or almost every survey year made up 74% of all documented species, while 16% percent had occasional status and 11% accidental (Table 1). The 5 most commonly recorded species were: Common Chlorospingus (*Chlorospingus flavopectus*) (Fig. 12A) (11.0% of all records), Slate-throated Redstart (*Myioborus miniatus*) (Fig. 13J) (7.8%), Sulphur-winged Parakeet (*Pyrrhura hoffmanni*) (Fig. 7B) (7.1%), Silver-throated Tanager (*Tangara icterocephala*) (Fig. 14K) (5.1%), and Northern Emerald-Toucanet (*Aulacorhynchus prasinus*) (Fig. 6C) (2.9%).

Of the documented species, 40 (20%) are considered endemic to the region. Garrigues et al. (2020a) listed 50 species as endemic to the highlands of Costa Rica and western Panamá (although a few of these are known to extend into eastern Panamá and/or northwestern Colombia). Of these 50 species, 36 were documented in the reserve, and 31 are considered resident in the reserve. An additional four species documented in the reserve were listed by Garrigues et al. (2020a) as endemic to the Pacific lowlands of southern Costa Rica and western Panamá, although some of these also occur further east into Panamá. Details on the distribution of endemic species are provided in the annotations.

The most commonly recorded endemic species were Sulphur-winged Parakeet, Black-faced Solitaire (*Myadestes melanops*) (Fig. 10P), White-throated Mountain-gem (*Lampornis castaneoventris*) (Fig. 3L, M), Yellow-thighed Brushfinch (*Atlapetes tibialis*) (Fig. 12F), Costa Rican Warbler (*Basileuterus melanotis*) (Fig. 13F), Black Guan (*Chamaepetes unicolor*) (Fig. 2C), Chiriqui Quail-Dove (*Zentrygon chiriquensis*) (Fig. 2M), and Scintillant Hummingbird (*Selasphorus scintilla*) (Fig. 3Q, R).

Four species are listed as Near Threatened (NT) and one Vulnerable (VU) on the IUCN Red List (IUCN 2020). The NT species are Golden-winged Warbler (*Vermivora chrysoptera*) (Fig. 12M), Resplendent Quetzal (*Pharomachrus mocinno*) (Fig. 5N, 5O), Ornate Hawk-Eagle (*Spizaetus ornatus*) (Figs. 4R, 5A), and Olive-sided Flycatcher (*Contopus cooperi*) (Fig. 9A). The VU species is Ruddy Pigeon (*Patagioenas subvinacea*) (Fig. 2G).

Walking surveys recorded the most species with 187, 17 of which were not recorded by any other survey method, while point count surveys recorded 172 species, three of which were unique to the point counts. Camera traps recorded 30 species, two of which, Ruddy Quail-Dove (*Geotrygon montana*) (Fig. 2J) and Gray-cowled Wood-Rail (*Aramides cajaneus*) (Fig. 4K), were only recorded on camera traps (Table 1). Owl call-playback surveys recorded several species, but voucher photos were only obtained for two, Mottled Owl (Figs. 5L & 5M) and Bare-shanked Screech-Owl (Fig. 5K), and both species were also recorded during diurnal surveys at least once. Eleven species were only recorded by photograph (Table 1).

Annotated List

We present an annotated list of species including notes on salient identification features, features unique to identifying birds in the area, IUCN Red List conservation status (IUCN 2020), and endemism in Costa Rica and the surrounding region (Garrigues et al. 2020a). For each species, information provided includes: number of records,

Table 1. Summary of bird species records, status in the reserve, and yearly presence in Cloudbridge Nature Reserve, Costa Rica.

English name[1]	Scientific name	Records	Status[2]	Survey method					Years recorded[3]						
				Point count	Walking	Camera trap	Call-playback	Photo only	Pre-2016	2016	2017	2018	2019	2020	2021[4]
									Number of survey days						
									0	118	154	156	209	99	0
Tinamidae															
Highland Tinamou[a]	*Nothocercus bonapartei*	60	R		x	x					x		x	x	
Cracidae															
Gray-headed Chachalaca	*Ortalis cinereiceps*	6	R	x	x					x	p		x	x	
Black Guan (Eh-wp)	*Chamaepetes unicolor*	455	R	x	x	x				x	x	x	x	x	
Odontophoridae															
Black-breasted Wood-Quail (Eh-wp)	*Odontophorus leucolaemus*	21	R	x	x	x						x	x	x	
Spotted Wood-Quail	*Odontophorus guttatus*	878	R	x	x	x				x	x	x	x	x	
Columbidae															
Band-tailed Pigeon	*Patagioenas fasciata*	292	R	x	x					x	x	x	x	x	
Ruddy Pigeon (VU)	*Patagioenas subvinacea*	307	R	x	x					x	x	x	x	x	
Ruddy Ground Dove	*Columbina talpacoti*	9	O	x	x					x		p	x		
Ruddy Quail-Dove	*Geotrygon montana*	3	A			x								x	
White-tipped Dove	*Leptotila verreauxi*	9	R	x	x	x				x		p	x	x	
Buff-fronted Quail-Dove (Eh-wp)	*Zentrygon costaricensis*	60	R	x	x	x					x	x	x	x	
Chiriqui Quail-Dove (Eh-wp)	*Zentrygon chiriquensis*	444	R	x	x	x				x	x	x	x	x	
Cuculidae															
Squirrel Cuckoo	*Piaya cayana*	149	R	x	x					x	x	x	x	x	
Caprimulgidae															
Common Pauraque[b]	*Nyctidromus albicollis*	4	R		x			p				x	x		
Dusky Nightjar (Eh-wp)	*Antrostomus saturatus*	1	A				x							p	
Apodidae															
Chestnut-collared Swift	*Streptoprocne rutila*	3	A		x								x		
White-collared Swift	*Streptoprocne zonaris*	252	R	x	x					x	x	x	x	x	
Vaux's Swift	*Chaetura vauxi*	11	O		x						x	p			
Trochilidae															
Green Hermit	*Phaethornis guy*	268	R	x	x	x		p		x	x	x	x	x	
Green-fronted Lancebill	*Doryfera ludovicae*	12	O	x	x					x	x		x		
Brown Violetear	*Colibri delphinae*	15	O	x	x							x	x		
Lesser Violetear (NA)	*Colibri cyanotus*	356	R	x	x					x	x	x	x	x	
Purple-crowned Fairy	*Heliothryx barroti*	68	R	x	x					x	x	x	x	x	
Green-crowned Brilliant	*Heliodoxa jacula*	115	R	x	x					x	x	x	x	x	
Talamanca Hummingbird (NA, Eh-wp)	*Eugenes spectabilis*	26	R	x	x					x	x	x	x	x	
Long-billed Starthroat	*Heliomaster longirostris*	2	A				x				p				
White-throated Mountain-gem (Eh-wp)	*Lampornis castaneoventris*	745	R	x	x					x	x	x	x	x	
Magenta-throated Woodstar (Eh-wp)	*Philodice bryantae*	82	R	x	x					x	x	x	x	x	
Volcano Hummingbird (Eh-wp)	*Selasphorus flammula*	36	O	x	x					x			x	x	
Scintillant Hummingbird (Eh-wp)	*Selasphorus scintilla*	287	R	x	x					x	x	x	x	x	
Garden Emerald (El-ep)	*Chlorostilbon assimilis*	9	R	x	x							p	x	x	
Violet-headed Hummingbird	*Klais guimeti*	18	R	x	x					x	x	x	x		
Violet Sabrewing	*Campylopterus hemileucurus*	140	R	x	x					x	x	x	x	x	
Stripe-tailed Hummingbird	*Eupherusa eximia*	389	R	x	x			p		x	x	x	x	x	
White-tailed Emerald (Eh-wp)	*Elvira chionura*	42	R	x	x					x	x	x	x	x	
Snowy-bellied Hummingbird (El-ep)	*Amazilia edward*	57	R	x	x					x	x	x	x	x	
Rufous-tailed Hummingbird	*Amazilia tzacatl*	27	R	x	x					x	x	x	x	x	
Rallidae															
Gray-cowled Wood-Rail	*Aramides cajaneus*	1	A			x					x				
Fregatidae															
Magnificent Frigatebird	*Fregata magnificens*	2	O		x						x	p			
Ardeidae															
Fasciated Tiger-Heron	*Tigrisoma fasciatum*	1	A				x				p				
Cattle Egret	*Bubulcus ibis*	1	A				x	p							
Cathartidae															
Black Vulture	*Coragyps atratus*	57	R	x	x			p		x	x	x	x	x	
Turkey Vulture	*Cathartes aura*	40	R	x	x					x		x	x	x	
Accipitridae															
Swallow-tailed Kite	*Elanoides forficatus*	13	A	x	x								x		
Ornate Hawk-Eagle (NT)	*Spizaetus ornatus*	34	R	x	x					x	x	x	x		

English name[1]	Scientific name	Records	Status[2]	Survey method					Years recorded[3]						
				Point count	Walking	Camera trap	Call-playback	Photo only	Pre-2016	2016	2017	2018	2019	2020	2021[4]
									Number of survey days						
									0	118	154	156	209	99	0
Double-toothed Kite	*Harpagus bidentatus*	1	A					x	p						
Bicolored Hawk	*Accipiter bicolor*	1	A					x					p		
Great Black Hawk	*Buteogallus urubitinga*	2	A					x				p			
Barred Hawk	*Morphnarchus princeps*	4	O	x	x							x	x		
Roadside Hawk	*Rupornis magnirostris*	1	A					x				p			
Broad-winged Hawk	*Buteo platypterus*	3	O	x	x						x			x	
Short-tailed Hawk	*Buteo brachyurus*	2	O	x							x	p			
Red-tailed Hawk	*Buteo jamaicensis*	13	R, M	x	x					x	x	x	x	x	
Strigidae															
Bare-shanked Screech-Owl (Eh-c)	*Megascops clarkii*	72	R	x	x		x			x	x	x	x	x	
Mottled Owl	*Ciccaba virgata*	188	R	x			x			x	x	x	x	x	
Trogonidae															
Resplendent Quetzal (NT)	*Pharomachrus mocinno*	84	R	x	x				p	x	x	x	x	x	
Collared Trogon	*Trogon collaris*	223	R	x	x					x	x	x	x	x	
Momotidae															
Lesson's Motmot	*Momotus lessonii*	130	R	x	x	x				x	x	x	x	x	
Capitonidae															
Red-headed Barbet	*Eubucco bourcierii*	547	R	x	x					x	x	x	x	x	
Ramphastidae															
Northern Emerald-Toucanet	*Aulacorhynchus prasinus*	1156	R	x	x	x				x	x	x	x	x	
Picidae															
Olivaceous Piculet	*Picumnus olivaceus*	9	O	x	x						x		x		
Yellow-bellied Sapsucker	*Sphyrapicus varius*	2	A		x							x			
Acorn Woodpecker	*Melanerpes formicivorus*	30	R	x	x					x	x	x	x	x	
Red-crowned Woodpecker	*Melanerpes rubricapillus*	10	O		x					x	p		x		
Hairy Woodpecker	*Dryobates villosus*	112	R	x	x	x				x	x	x	x	x	
Smoky-brown Woodpecker	*Dryobates fumigatus*	7	R	x	x						x	x	x	x	p
Golden-olive Woodpecker	*Colaptes rubiginosus*	32	R	x	x					x	x	x	x	x	
Falconidae															
Barred Forest-Falcon	*Micrastur ruficollis*	11	R	x	x						x	x	x		
Crested Caracara	*Caracara cheriway*	1	A				x						p		
Yellow-headed Caracara	*Milvago chimachima*	7	O	x	x			p				x		x	
Bat Falcon	*Falco rufigularis*	13	O	x	x					x	x		x		
Psittacidae															
Barred Parakeet	*Bolborhynchus lineola*	298	R	x	x						p	x	x		
Brown-hooded Parrot	*Pyrilia haematotis*	128	R	x	x							x	x	x	
White-crowned Parrot	*Pionus senilis*	63	O	x	x					x		x	x		
Sulphur-winged Parakeet (Eh-wp)	*Pyrrhura hoffmanni*	2854	R	x	x					x	x	x	x	x	
Thamnophilidae															
Slaty Antwren	*Myrmotherula schisticolor*	133	R	x	x					x	x	x	x	x	
Grallariidae															
Scaled Antpitta	*Grallaria guatimalensis*	6	O	x	x				p				x		
Rhinocryptidae															
Silvery-fronted Tapaculo (Eh-wp)	*Scytalopus argentifrons*	34	R	x	x					x	x	x	x	x	
Furnariidae															
Tawny-throated Leaftosser	*Sclerurus mexicanus*	27	R	x	x						x	x	x	x	
Olivaceous Woodcreeper	*Sittasomus griseicapillus*	20	R	x	x					x	x	x	x	x	
Wedge-billed Woodcreeper	*Glyphorynchus spirurus*	14	R	x	x				p	x		x	x	x	
Brown-billed Scythebill	*Campylorhamphus pusillus*	19	R	x	x					x	x	x	x	x	
Spot-crowned Woodcreeper	*Lepidocolaptes affinis*	491	R	x	x					x	x	x	x	x	
Streaked Xenops	*Xenops rutilans*	47	R	x	x					x	x	x	x	x	
Buffy Tuftedcheek	*Pseudocolaptes lawrencii*	13	R	x	x					x	x	x	x		
Buff-fronted Foliage-gleaner	*Philydor rufum*	16	O	x	x								x	x	
Scaly-throated Foliage-gleaner	*Anabacerthia variegaticeps*	20	R	x	x						x	x	x	x	
Lineated Foliage-gleaner	*Syndactyla subalaris*	146	R	x	x					x	x	x	x	x	
Streak-breasted Treehunter (Eh-wp)	*Thripadectes rufobrunneus*	50	R	x	x					x	x	x	x	x	
Spotted Barbtail	*Premnoplex brunnescens*	283	R	x	x					x	x	x	x	x	
Ruddy Treerunner (Eh-wp)	*Margarornis rubiginosus*	31	R	x	x					x	x	x	x	x	
Red-faced Spinetail	*Cranioleuca erythrops*	331	R	x	x					x	x	x	x	x	

English name[1]	Scientific name	Records	Status[2]	Survey method					Years recorded[3]						
				Point count	Walking	Camera trap	Call-playback	Photo only	Pre-2016	2016	2017	2018	2019	2020	2021[4]
									Number of survey days						
									0	118	154	156	209	99	0
Tityridae															
Masked Tityra	*Tityra semifasciata*	61	R	x	x					x	x	x	x	x	
Barred Becard	*Pachyramphus versicolor*	86	R	x	x					x	x	x	x	x	
Black-and-white Becard	*Pachyramphus albogriseus*	20	R	x	x					x		x	x	x	
Tyrannidae															
White-throated Spadebill	*Platyrinchus mystaceus*	7	R	x	x						x	x	x		
Olive-striped Flycatcher	*Mionectes olivaceus*	81	R	x	x				p	x	x	x	x	x	
Slaty-capped Flycatcher	*Leptopogon superciliaris*	77	R	x	x					x	x	x	x	x	
Scale-crested Pygmy-Tyrant	*Lophotriccus pileatus*	33	R	x	x					x	x	x	x		
Eye-ringed Flatbill	*Rhynchocyclus brevirostris*	34	R	x	x					x	x	x	x	x	
Yellow-olive Flycatcher	*Tolmomyias sulphurescens*	5	A		x								x		
Yellow-bellied Elaenia	*Elaenia flavogaster*	2	A	x								x			
Mountain Elaenia	*Elaenia frantzii*	64	R	x	x					x	x	x	x	x	
Torrent Tyrannulet	*Serpophaga cinerea*	54	R	x	x					x	x	x	x	x	
Rough-legged Tyrannulet	*Phyllomyias burmeisteri*	3	O	x	x					x		x	p		
Mistletoe Tyrannulet	*Zimmerius parvus*	314	R	x	x					x	x	x	x	x	
Tufted Flycatcher	*Mitrephanes phaeocercus*	282	R	x	x					x	x	x	x	x	
Olive-sided Flycatcher (NT)	*Contopus cooperi*	29	M	x	x					x	x	x	x	x	
Dark Pewee (Eh-wp)	*Contopus lugubris*	13	O	x	x					x	x		x		
Western Wood-Pewee	*Contopus sordidulus*	11	O	x	x					x	x		p		
Yellow-bellied Flycatcher	*Empidonax flaviventris*	67	M	x	x					x	x	x	x	x	
Yellowish Flycatcher	*Empidonax flavescens*	363	R	x	x					x	x	x	x	x	
Black-capped Flycatcher (Eh-wp)	*Empidonax atriceps*	33	R	x	x					x	x	x	x	x	
Black Phoebe	*Sayornis nigricans*	13	R	x	x				p	x	x	x	x		
Dusky-capped Flycatcher	*Myiarchus tuberculifer*	143	R	x	x					x	x	x	x	x	
Great Kiskadee	*Pitangus sulphuratus*	67	R	x	x					x	x	x	x	x	
Boat-billed Flycatcher	*Megarynchus pitangua*	151	R	x	x					x	x	x	x	x	
Social Flycatcher	*Myiozetetes similis*	10	R	x	x						x	x	x	x	
Gray-capped Flycatcher	*Myiozetetes granadensis*	3	O		x				p	x					
Golden-bellied Flycatcher (Eh-wp)	*Myiodynastes hemichrysus*	215	R	x	x					x	x	x	x	x	
Piratic Flycatcher	*Legatus leucophaius*	3	O		x							p	x		
Tropical Kingbird	*Tyrannus melancholicus*	16	O	x	x					x	x		x		
Vireonidae															
Rufous-browed Peppershrike	*Cyclarhis gujanensis*	174	R	x	x					x	x	x	x	x	
Lesser Greenlet	*Pachysylvia decurtata*	34	R	x	x					x	x	x	x	x	
Yellow-throated Vireo	*Vireo flavifrons*	67	M	x	x					x	x	x	x	x	
Yellow-winged Vireo (Eh-wp)	*Vireo carmioli*	51	R	x	x					x	x	x	x	x	
Philadelphia Vireo	*Vireo philadelphicus*	363	M	x	x					x	x	x	x	x	
Brown-capped Vireo	*Vireo leucophrys*	999	R	x	x					x	x	x	x	x	
Corvidae															
Silvery-throated Jay (Eh-wp)	*Cyanolyca argentigula*	38	A	x	x								x		
Brown Jay	*Psilorhinus morio*	81	R	x	x	x				x	x	x	x	x	
Hirundinidae															
Blue-and-white Swallow	*Pygochelidon cyanoleuca*	32	O	x	x						x		x	p	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	4	A		x								x		
Southern Rough-winged Swallow	*Stelgidopteryx ruficollis*	4	A		x							x			
Troglodytidae															
Scaly-breasted Wren	*Microcerculus marginatus*	330	R	x	x					x	x	x	x	x	
House Wren	*Troglodytes aedon*	53	R	x	x					x	x	x	x	x	
Ochraceous Wren (Eh-ep)	*Troglodytes ochraceus*	108	R	x	x					x	x	x	x	x	
Rufous-breasted Wren	*Pheugopedius rutilus*	175	R	x	x	x				x	x	x	x	x	
Isthmian Wren (NA, El-ep)	*Cantorchilus elutus*	23	R	x	x					x	x	x	x		
Gray-breasted Wood-Wren	*Henicorhina leucophrys*	776	R	x	x					x	x	x	x	x	
Cinclidae															
American Dipper	*Cinclus mexicanus*	30	R	x	x					x	x	x	x	x	
Turdidae															
Black-faced Solitaire (Eh-wp)	*Myadestes melanops*	759	R	x	x					x	x	x	x	x	
Black-billed Nightingale-Thrush (Eh-wp)	*Catharus gracilirostris*	205	R	x	x	x			p	x	x	x	x	x	
Orange-billed Nightingale-Thrush	*Catharus aurantiirostris*	41	R	x	x	x				x		x	x	x	

English name[1]	Scientific name	Records	Status[2]	Survey method					Years recorded[3]						
				Point count	Walking	Camera trap	Call-playback	Photo only	Pre-2016	2016	2017	2018	2019	2020	2021[4]
									Number of survey days						
									0	118	154	156	209	99	0
Slaty-backed Nightingale-Thrush	*Catharus fuscater*	291	R	x	x	x				x	x	x	x	x	
Ruddy-capped Nightingale-Thrush	*Catharus frantzii*	464	R	x	x	x				x	x	x	x	x	
Swainson's Thrush	*Catharus ustulatus*	390	M	x	x	x				x	x	x	x	x	
Mountain Thrush	*Turdus plebejus*	315	R	x	x	x				x	x	x	x	x	
Clay-colored Thrush	*Turdus grayi*	106	R	x	x					x	x	x	x	x	
Ptiliogonatidae															
Long-tailed Silky-flycatcher (Eh-wp)	*Ptiliogonys caudatus*	216	R	x	x					x	x	x	x	x	
Fringillidae															
Golden-browed Chlorophonia (Eh-wp)	*Chlorophonia callophrys*	163	R	x	x					x	x	x	x	x	
Yellow-throated Euphonia	*Euphonia hirundinacea*	1	A					x				p			
Elegant Euphonia	*Euphonia elegantissima*	332	R	x	x					x	x	x	x	x	
Spot-crowned Euphonia (El-wp)	*Euphonia imitans*	11	R	x	x				p	x	x	x	x	x	
Lesser Goldfinch	*Spinus psaltria*	2	O		x							x	p		
Yellow-bellied Siskin	*Spinus xanthogastrus*	5	O	x	x					x		x			
Passerellidae															
Sooty-capped Chlorospingus (Eh-wp)	*Chlorospingus pileatus*	25	R	x	x					x	x	x	x		
Common Chlorospingus	*Chlorospingus flavopectus*	4410	R	x	x					x	x	x	x	x	
Chestnut-capped Brushfinch	*Arremon brunneinucha*	580	R	x	x					x	x	x	x	x	
Sooty-faced Finch (Eh-c)	*Arremon crassirostris*	1	A		x								x		
Rufous-collared Sparrow	*Zonotrichia capensis*	82	R	x	x					x	x	x	x	x	
White-naped Brushfinch	*Atlapetes albinucha*	145	R	x	x	x				x	x	x	x	x	
Yellow-thighed Brushfinch (Eh-wp)	*Atlapetes tibialis*	640	R	x	x	x				x	x	x	x	x	
Icteridae															
Chestnut-headed Oropendola	*Psarocolius wagleri*	2	O		x								x		p
Baltimore Oriole	*Icterus galbula*	2	O		x						x	x			
Bronzed Cowbird	*Molothrus aeneus*	4	O		x						x		x		
Melodious Blackbird	*Dives dives*	7	O	x	x				p				x		
Parulidae															
Ovenbird	*Seiurus aurocapilla*	5	O			x							p	x	
Louisiana Waterthrush	*Parkesia motacilla*	9	M	x	x	x					x	x	x	x	
Golden-winged Warbler (NT)	*Vermivora chrysoptera*	241	M	x	x					x	x	x	x	x	
Black-and-white Warbler	*Mniotilta varia*	472	M	x	x					x	x	x	x	x	
Flame-throated Warbler (Eh-wp)	*Oreothlypis gutturalis*	169	R	x	x					x	x	x	x	x	
Tennessee Warbler	*Leiothlypis peregrina*	844	M	x	x					x	x	x	x	x	
Tropical Parula	*Setophaga pitiayumi*	230	R	x	x					x	x	x	x	x	
Blackburnian Warbler	*Setophaga fusca*	212	M	x	x					x	x	x	x	x	
Black-throated Green Warbler	*Setophaga virens*	301	M	x	x					x	x	x	x	x	
Black-cheeked Warbler (Eh-wp)	*Basileuterus melanogenys*	194	R	x	x					x	x	x	x	x	
Golden-crowned Warbler	*Basileuterus culicivorus*	692	R	x	x	x				x	x	x	x	x	
Costa Rican Warbler (NA, Eh-wp)	*Basileuterus melanotis*	474	R	x	x	x				x	x	x	x	x	
Buff-rumped Warbler	*Myiothlypis fulvicauda*	33	R	x	x	x					x	x	x		
Canada Warbler	*Cardellina canadensis*	4	O	x	x								x	x	
Wilson's Warbler	*Cardellina pusilla*	926	M	x	x					x	x	x	x	x	
Slate-throated Redstart	*Myioborus miniatus*	3159	R	x	x	x				x	x	x	x	x	
Collared Redstart (Eh-wp)	*Myioborus torquatus*	88	R	x	x					x	x	x	x	x	
Cardinalidae															
Summer Tanager	*Piranga rubra*	107	M	x	x				p	x	x	x	x	x	
Flame-colored Tanager	*Piranga bidentata*	387	R	x	x					x	x	x	x	x	
White-winged Tanager	*Piranga leucoptera*	149	R	x	x					x	x	x	x	x	
Black-thighed Grosbeak (Eh-wp)	*Pheucticus tibialis*	27	R	x	x				p		x	x	x	x	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	8	M	x	x				p	x	x		x	x	
Blue Seedeater	*Amaurospiza concolor*	34	R	x	x					x	x	x	x	x	
Thraupidae															
Scarlet-rumped Tanager	*Ramphocelus passerinii*	153	R	x	x					x	x	x	x	x	
Blue-gray Tanager	*Thraupis episcopus*	10	O	x	x					x		x	x		
Palm Tanager	*Thraupis palmarum*	18	R	x	x					x		x	x	x	
Speckled Tanager	*Ixothraupis guttata*	229	R	x	x					x	x	x	x	x	
Golden-hooded Tanager	*Stilpnia larvata*	31	R	x	x				p	x	x	x	x	x	
Spangle-cheeked Tanager (Eh-wp)	*Tangara dowii*	97	R	x	x					x	x	x	x	x	

English name[1]	Scientific name	Records	Status[2]	Survey method					Years recorded[3]						
				Point count	Walking	Camera trap	Call-playback	Photo only	Pre-2016	2016	2017	2018	2019	2020	2021[4]
									Number of survey days						
									0	118	154	156	209	99	0
Bay-headed Tanager	*Tangara gyrola*	99	R	x	x					x	x	x	x	x	
Silver-throated Tanager	*Tangara icterocephala*	2070	R	x	x					x	x	x	x	x	
Scarlet-thighed Dacnis	*Dacnis venusta*	259	R	x	x					x	x	x	x	x	
Red-legged Honeycreeper	*Cyanerpes cyaneus*	1	A					x		p					
Slaty Flowerpiercer (Eh-wp)	*Diglossa plumbea*	37	R	x	x					x	x	x	x		
Variable Seedeater	*Sporophila corvina*	6	R		x						x	x	x	x	
Bananaquit	*Coereba flaveola*	8	R	x	x					x	x	x	x		
Yellow-faced Grassquit	*Tiaris olivacea*	57	R	x	x					x	x	x	x	x	
Buff-throated Saltator	*Saltator maximus*	130	R	x	x					x	x	x	x	x	

[1] IUCN Status: NA = Not Assessed, VU = Vulnerable, NT = Near Threatened, blank = Least Concern. Location of endemism: Eh-wp = Highlands, Costa Rica to western Panamá, Eh-ep = Highlands, Costa Rica to eastern Panamá, Eh-c = Highlands, Costa Rica to northwestern Colombia, El-wp = Pacific lowlands, southern Costa Rica to western Panamá, El-ep = Pacific lowlands, southern Costa Rica to eastern Panamá.

[2] R = Resident or M = yearly Migrant, recorded every survey year since first record (3-yr min), or all but one; O = Occasional, gaps in yearly records; A = Accidental, recorded in a single year.

[3] x = species recorded during surveys, p = species only recorded by photograph.

[4] Only photographs were collected in 2021, no survey data was collected.

[a] Camera trap images show regular presence between Mar and Nov, inclusive.

[b] Nocturnal bird underrepresented in the data. Incidental observations by night and early morning researchers and authors indicate it has a more abundant presence than is recorded here.

stations and/or trails where the species was recorded (see Supplemental Table S206 for trail shortforms and more precise location coordinates), date of first and last records, record types (point coint (PC), walking survey (WS), call-playback (CP), camera trap (CT), and/or photo (PH)), voucher image type (photo (PH) or camera trap image (CT)), and, if relevant, endemic status (highlands, Costa Rica to western Panamá (Eh-wp); highlands, Costa Rica to eastern Panamá (Eh-ep); highlands, Costa Rica to northwestern Colombia (Eh-c); Pacific lowlands, southern Costa Rica to western Panamá (El-wp); Pacific lowlands, southern Costa Rica to eastern Panamá (El-ep)). Notes on endemic ranges are provided when the ranges presented here differ from Garrigues et al. 2020a. Detailed information for each record, including GPS coordinates and observers, are provided in the supplementary material.

Tinamidae

Nothocercus bonapartei (Gray, 1867), Highland Tinamou

Figure 2A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 60 (Supplemental Table S1); stations: E7, E8, E9, E10, G1, M8, R4, and S2, and trail: MO; 11.II.2017 to 2.V.2020; type: WS and CT; voucher: CT. Only one survey record, but regular camera trap records March to November.

Cracidae

Ortalis cinereiceps (Gray, 1867), Gray-headed Chachalaca

Figure 2B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 6 (Supplemental Table S2); stations: 36 and 39, and trails: GA and JI; 1.XI.2016 to 2.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Brown with a gray head and rufous primaries.

Chamaepetes unicolor (Salvin, 1867), Black Guan

Figure 2C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 455 (Supplemental Table S3); stations: 1, 3, 7, 9, 12, 14, 15, 16, 17, 19, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, E4, E7, E8, E9, E10, G4, G5, G6, I1, M8, M9, R3, R4, S2, and W1, and trails: AM, BA, CH, CV, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WF, and WS; 31.III.2016 to 7.V.2020; type: PC, WS, CT, and PH; voucher: PH; endemic: Eh-wp.

Identification. Glossy black with blue facial skin, dark red eye, and pink-red legs.

Odontophoridae

Odontophorus leucolaemus (Salvin, 1867), Black-breasted Wood-Quail

Figure 2D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 21 (Supplemental Table S4); stations: 14, E9, and M7, and trails: DV, GA, HE, PR, and VR; 25.VI.2018 to 12.III.2020; type: PC, WS, and CT; voucher: PH; endemic: Eh-wp. Recorded during point count and walking surveys in December, and February through June. Camera trap records March, November, and December.

Identification. Black face and breast. Although typically documented as having a white throat patch, birds observed at Cloudbridge showed very little white in the throat; some white feathering was visible only when the throat was extended in mid-vocalization.

Odontophorus guttatus (Gould, 1838), Spotted Wood-Quail

Figure 2E

Figure 2. Birds of Cloudbridge. **A.** *Nothocercus bonapartei*. **B.** *Ortalis cinereiceps*. **C.** *Chamaepetes unicolor*. **D.** *Odontophorus leucolaemus*. **E.** *Odontophorus guttatus*. **F.** *Patagioenas fasciata*. **G.** *Patagioenas subvinacea*. **H.** *Columbina talpacoti*, male. **I.** *C. talpacoti*, female. **J.** *Geotrygon montana*, male. **K.** *Leptotila verreauxi*. **L.** *Zentrygon costaricensis*. **M.** *Zentrygon chiriquensis*. **N.** *Piaya cayana*. **O.** *Nyctidromus albicollis*. **P.** *Antrostomus saturatus*. **Q.** *Streptoprocne rutila*. **R.** *Streptoprocne zonaris*. Photos by: L. Allnatt (E, H, I, K, N), CB Research (A, J, L), G. Henry (P), J. Slifkin (C, D, F, G, M, Q, R), and M. Smokoska (B, O).

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 878 (Supplemental Table S5); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 19, 20, 27, 28, 30, 31, 33, 34, 37, 38, E4, E7, E8, E9, E10, E11, G5, G6, I1, M8, M9, R3, and S2, and trails: AM, BA, CH, DV, GA, HE, JI, MO, PR, RI, SE, VR, and WS; 7.IV.2016 to 19.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. White-streaked black throat, white-spotted rufous-brown underparts.

Columbidae

***Patagioenas fasciata* (Say, 1823), Band-tailed Pigeon**
Figure 2F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 292 (Supplemental Table S6); stations: 3, 5, 12, 14, 15, 17, 18, 19, 20, 27, 28, 33, 34, 36, and 37, and trails: DV, GA, HE, JI, MO, PR, RI, and VR; 25.IV.2016 to 20.V.2020; type: PC and WS; voucher: PH.

Identification. Vinaceous-gray with a white nape band and bright yellow bill and feet.

***Patagioenas subvinacea* (Lawrence, 1898), Ruddy Pigeon (VU)**
Figure 2G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 307 (Supplemental Table S7); stations: 1, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 27, 28, 30, 31, and 33, and trails: BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, and WF; 23.III.2016 to 13.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Fairly uniform, ruddy to pinkish-brown. Similar in appearance to the Short-billed Pigeon (*Patagioenas nigrirostris*), although it typically has ruddier wings and is found at higher elevations.

***Columbina talpacoti* (Temminck, 1810), Ruddy Ground Dove**
Figure 2H, I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 9 (Supplemental Table S8); stations: 19, 20, and 33, and trail: PR; 25.IV.2016 to 27.V.2019; type: PC, WS, and PH; voucher: PH.

***Geotrygon montana* (Linnaeus, 1758), Ruddy Quail-Dove**
Figure 2J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3 (Supplemental Table S9); stations: E9, E10, and G6; 26.I.2020 to 30.I.2020; type: CT; voucher: CT.

Identification. Ruddy-brown with a pale facial stripe and throat.

***Leptotila verreauxi* (Bonaparte, 1855), White-tipped Dove**
Figure 2K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 9 (Supplemental Table S10); stations: 5 and E7, and trails: BA, CH, GA, MO, and PR; 12.IX.2016 to 28.IV.2020; type: PC, WS, CT, and PH; voucher: PH.

***Zentrygon costaricensis* (Lawrence, 1868), Buff-fronted Quail-Dove**
Figure 2L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 60 (Supplemental Table S11); stations: 3, 24, E8, E9, E10, G5, G6, M7, M8, and M9, and trails: GA and JI; 16.VIII.2017 to 16.V.2020; type: PC, WS, and CT; voucher: CT; endemic: Eh-wp. Recorded 4 times during point count and walking surveys, but regular camera trap records between April and December.

Identification. Blue-gray head and underparts, buff forehead, rufous-brown wings.

***Zentrygon chiriquensis* (Sclater, 1856), Chiriqui Quail-Dove**
Figure 2M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 444 (Supplemental Table S12); stations: 5, 12, 14, 15, 16, 30, 31, 33, 38, 39, E4, E7, E8, E9, E10, E11, G4, G5, G6, M4, M7, M8, M9, R3, R4, S2, and W1, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, and WF; 24.III.2016 to 9.V.2020; type: PC, WS, and CT; voucher: PH; endemic: Eh-wp.

Identification. Ruddy overall with a contrasting blue-gray crown, buffy mid-face, and black facial stripe.

Cuculidae

***Piaya cayana* (Linnaeus, 1766), Squirrel Cuckoo**
Figure 2N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 149 (Supplemental Table S13); stations: 1, 3, 7, 12, 14, 15, 16, 17, 18, 20, 24, 26, 27, 28, 31, 32, 33, 34, 36, and 38, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WS; 28.IV.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Caprimulgidae

***Nyctidromus albicollis* (Gmelin, 1789), Common Pauraque**
Figure 2O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S14); trails: JI and PR; 15.III.2015 to 20.VIII.2019; type: WS and PH; voucher: PH. Nocturnal, its presence is underrepresented in the data. Commonly seen and heard along the road into the reserve in the early morning and evening, and occasionally seen during night surveys.

***Antrostomus saturatus* (Salvin, 1870), Dusky Nightjar**
Figure 2P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S15); trail: WC;

17.IV.2020; type: PH; voucher: PH; endemic: Eh-wp.

Identification. Dark and heavily spotted with cinnamon-rufous.

Apodidae

***Streptoprocne rutila* (Vieillot, 1817), Chestnut-collared Swift**
Figure 2Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3 (Supplemental Table S16); trails: JI and PR; 11.IV.2019 to 8.VII.2019; type: WS and PH; voucher: PH.

Identification. Broad chestnut collar.

***Streptoprocne zonaris* (Shaw, 1796), White-collared Swift**
Figure 2R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 252 (Supplemental Table S17); stations: 1, 3, 15, 17, 18, 19, 22, 26, 30, 31, 35, and trails: BA, CH, DV, GA, HE, JI, LQ, PR, RI, and VR; 12.X.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Full white collar.

***Chaetura vauxi* (Townsend, 1839), Vaux's Swift**
Figure 3A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 11 (Supplemental Table S18); trails: DV, JI, PR, SE, and VR; 6.II.2017 to 9.I.2018; type: WS and PH; voucher: PH.

Trochilidae

***Phaethornis guy* (Lesson, 1833), Green Hermit**
Figure 3B, C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 268 (Supplemental Table S19); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, and R4, and trails: BA, CV, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WS; 5.II.2015 to 15.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. The male is dark blue-green with a long decurved bill with an orange-red lower mandible and a dark tail with elongated white tips to the central rectrices (Fig. 3B). The female is similar but has pale facial stripes and longer white tail tips (Fig. 3C).

***Doryfera ludovicae* (Bourcier & Mulsant, 1847), Green-fronted Lancebill**
Figure 3D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 12 (Supplemental Table S20); stations: 22 and 35, and trails: HE, MG, PR, RI, WS, and WF; 26.X.2016 to 17.IX.2019; type: PC, WS, and PH; voucher: PH.

Identification. Best identified by its long, slightly up-turned bill and coppery-bronze crown. The male has a small green frontlet and green underparts (Fig. 3D); the female has a smaller or absent frontlet and grayer underparts.

***Colibri delphinae* (Lesson, 1839), Brown Violetear**
Figure 3E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 15 (Supplemental Table S21); station: 20, and trails: BA, HE, PR, RI, and SE; 18.II.2018 to 8.VIII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Brown with a violet ear patch, green and blue throat patch, and cinnamon-fringed rump.

***Colibri cyanotus* (Bourcier, 1843), Lesser Violetear**
Figure 3F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 356 (Supplemental Table S22); stations: 1, 3, 5, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 26, 28, 30, 31, 33, 34, 36, 37, and 38, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS and WF; 10.VIII.2016 to 22.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Green with a violet-blue ear patch and decurved bill.

***Heliothryx barroti* (Bourcier, 1843), Purple-crowned Fairy**
Figure 3G, H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 68 (Supplemental Table S23); stations: 1, 5, 9, 12, 14, 15, 17, 18, 20, 26, 27, 28, 30, 31, 32, 36, and 37, and trails: BA, DV, GA, HE, JI, LQ, MG, PR, RI, and SE; 5.VIII.2016 to 11.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has a purple crown, black mask, and pure white throat to underparts (Fig. 3G). The female lacks a purple crown and has a longer tail (Fig. 3H).

***Heliodoxa jacula* (Gould, 1850), Green-crowned Brilliant**
Figure 3I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 115 (Supplemental Table S24); stations: 14, 16, 17, 18, 19, 20, 25, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, WS, and WF; 1.IV.2016 to 1.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is green with a forked dark blue tail and small violet-blue throat patch; the female has a short white malar stripe and green-spotted underparts (Fig. 3I).

***Eugenes spectabilis* (Lawrence, 1867), Talamanca Hummingbird**
Figure 3J

Figure 3. Birds of Cloudbridge. **A.** *Chaetura vauxi*. **B.** *Phaethornis guy*, male. **C.** *P. guy*, female. **D.** *Doryfera ludovicae*, male. **E.** *Colibri delphinae*. **F.** *Colibri cyanotus*. **G.** *Heliothryx barroti*, male. **H.** *H. barroti*, female. **I.** *Heliodoxa jacula*, female. **J.** *Eugenes spectabilis*, male. **K.** *Heliomaster longirostris*, female and immature. **L.** *Lampornis castaneoventris*, male. **M.** *L. castaneoventris*, female. **N.** *Philodice bryantae*, male. **O.** *Selasphorus flammula*, male. **P.** *S. flammula*, female. **Q.** *Selasphorus scintilla*, male. **R.** *S. scintilla*, female. Photos by: L. Allnatt (A), T. Claes (I), A. Greene (M), G. Henry (17), C. Romero (D), J. Roth (J), J. Slifkin (C, F, H, L, P), C. Smith (O, Q), M. Smokoska (B, K, R), F. Spooner (E, G), and A. Vitolo (N).

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 26 (Supplemental Table S25); stations: 3, 16, 17, 18, 19, 20, 22, 24, 30, 32, 35, and 36, and trails: BA, DV, GA, MG, MO, PR, VR, and WS; 4.IV.2016 to 28.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Large, mostly green with a white postocular spot. The male has a distinctive violet forecrown and turquoise throat (Fig. 3J); the female has mostly gray underparts.

Heliomaster longirostris (Audebert & Vieillot, 1801), Long-billed Starthroat

Figure 3K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S26); trail: PR; 15.III.2017; type: PH; voucher: PH.

Identification. Long, straight bill, white postocular spot, white malar stripes. The male has a blue-green forecrown and purple-red gorget; the female has a narrower, grayer gorget (Fig. 3K).

Lampornis castaneoventris (Gould, 1851), White-throated Mountain-gem

Figure 3L, M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 745 (Supplemental Table S27); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 16.III.2016 to 28.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. The male of subspecies *cinereicauda* has a white throat and postocular stripe, blue forecrown, and gray tail (Fig. 3L). The female has a white postocular stripe and cinnamon-rufous throat and underparts (Fig. 3M) but is difficult to distinguish from the female Purple-throated Mountain-gem (*Lampornis calolaemus*) except perhaps by its duller tail. The subspecies *cinereicauda*, which is endemic to the Talamanca range in Costa Rica, is considered by some authorities to be a separate species, the Gray-tailed Mountain-gem.

Philodice bryantae (Lawrence, 1867), Magenta-throated Woodstar

Figure 3N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 82 (Supplemental Table S28); stations: 3, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 33, 37, and 38, and trails: BA, CH, DV, GA, HE, JI, MG, MO, PR, RI, VR, and WC; 15.X.2016 to 25.XI.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. The male has a magenta gorget, long black and rufous tail, and white patches on either side of its rump (Fig. 3N). The female is similar to the female Volcano Hummingbird (*Selasphorus flammula*) (Fig. 3P) and the female Scintillant Hummingbird (Fig. 3R), but can be distinguished by the white patches on either side of its rump.

Selasphorus flammula (Salvin, 1865), Volcano Hummingbird

Figure 3O, P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 36 (Supplemental Table S29); stations: 9, 12, 14, 15, 16, 18, 28, 30, 36, and 37, and trails: BA, GA, HE, JI, MO, and RI; 1.IV.2016 to 22.IV.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp. Likely underrespresented in the survey due to females being mistaken for the more abundant female Scintillant Hummingbird (Fig. 3R).

Identification. The male (of subspecies *torridus*, present in the Talamanca Mountains) has a distinctive dull purple gorget (Fig. 3O). The female (Fig. 3P) is very similar to the female Scintillant Hummingbird (Fig. 3R).

Selasphorus scintilla (Gould, 1851), Scintillant Hummingbird

Figure 3Q, R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 287 (Supplemental Table S30); stations: 1, 3, 5, 7, 9, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 27, 28, 30, 31, 32, 34, 35, 36, 37, and 38, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, VR, WC, and WS; 18.III.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp. Likely overrepresented in the data due to females of the similar, but less abundant, Volcano Hummingbird (Fig. 3P) being mistaken for Scintillant Hummingbirds.

Identification. The male has a distinctive orange gorget (which can look dull green under certain light conditions) and also typically has more rufous on its face and flanks (Fig. 3Q) than the closely related Volcano Hummingbird. The female (Fig. 3R) is very similar to the female Volcano Hummingbird (Fig. 3P).

Chlorostilbon assimilis (Lawrence, 1861), Garden Emerald

Figure 4A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 9 (Supplemental Table S31); stations: 12, 17, 30, and 39, and trails: HE, JI, PR, RI, and WC; 20.II.2018 to 22.IV.2020; type: PC, WS, and PH; voucher: PH; endemic: El-ep. Extends into eastern Panamá (del Hoyo et al. 2020, Garrigues and Dean 2014).

Identification. The male is almost entirely green, with a black bill, forked dark blue tail, and white thigh tufts. The female is bronzy green above with a dusky ear covert patch, white postocular line, gray-white throat and underparts, dark tail with pale tips to the outer feathers, and black bill (Fig. 4A).

Klais guimeti (Bourcier, 1843), Violet-headed Hummingbird

Figure 4B, C

Figure 4. Birds of Cloudbridge. **A.** *Chlorostilbon assimilis*, female. **B.** *Klais guimeti*, male. **C.** *K. guimeti*, female. **D.** *Campylopterus hemileucurus*, male. **E.** *C. hemileucurus*, female. **F.** *Eupherusa eximia*, male. **G.** *E. eximia*, female. **H.** *Elvira chionura*, male. **I.** *Amazilia edward*. **J.** *Amazilia tzacatl*. **K.** *Aramides cajaneus*. **L.** *Fregata magnificens*. **M.** *Tigrisoma fasciatum*, immature. **N.** *Bubulcus ibis*. **O.** *Coragyps atratus*. **P.** *Cathartes aura*. **Q.** *Elanoides forficatus*. **R.** *Spizaetus ornatus*, adult. Photos by: L. Allnatt (B, L, P), CB Research (K, O), T. Jäger (M), K. Safford (R), M. Schellar (N), J. Slifkin (C, D, F, H, J, Q), M. Smokoska (G), F. Spooner (A, I), and Anthony Vitolo (E).

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 18 (Supplemental Table S32); stations: 17, 18, 19, 22, 26, 28, 30, 31, 35, and 36, and trails: BA, DV, HE, JI, MO, PR, RI, and VR; 1.XI.2016 to 22.VIII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Both sexes have a violet to blue crown, prominent white postocular spot, and grayish tail tips; the male has a bluish throat and green underparts (Fig. 4B), while the female is gray below (Fig. 4C).

Campylopterus hemileucurus (Deppe, 1830), Violet Sabrewing

Figure 4D, E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 140 (Supplemental Table S33); stations: 1, 9, 15, 16, 17, 18, 19, 20, 22, 25, 26, 27, 28, 30, 31, 32, 35, 36, 37, 38, and 39, and trails: AM, BA, CB, CV, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WS; 24.III.2016 to 25.XI.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is glossy violet (Fig. 4D), the female green above and gray below with a violet throat (Fig. 4E), both with broad white tail tips and a decurved bill.

Eupherusa eximia (Delattre, 1943), Stripe-tailed Hummingbird

Figure 4F, G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 389 (Supplemental Table S34); stations: 1, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, WS, and WF; 18.I.2015 to 19.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has fully green underparts, rufous wing patches, and white in its tail (Fig. 4F). The female is similar but with gray-white underparts (Fig. 4G).

Elvira chionura (Gould, 1851), White-tailed Emerald

Figure 4H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 42 (Supplemental Table S35); stations: 3, 16, 17, 18, 19, 22, 24, 27, 28, 30, 32, 35, 36, and 37, and trails: DV, GA, HE, MO, PR, and VR; 8.VIII.2016 to 29.IV.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. The male is green with a white belly-stripe to vent and white outertail feathers with black tips (Fig. 4H). The female has a mostly white throat and underparts and white outertail feathers with a black subterminal band.

Amazilia edward (Delattre & Bourcier, 1846), Snowy-bellied Hummingbird

Figure 4I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 57 (Supplemental Table S36); stations: 1, 3, 17, 18, 24, 28, 30, 31, 35, and 37, and trails: AM, BA, CB, DV, GA, HE, JI, MG, PR, RI, SE, WS, and WC; 30.VII.2016 to 9.I.2020; type: PC, WS, and PH; voucher: PH; endemic: El-ep. Extends into eastern Panamá, and a single record exists from northwestern Colombia (Garrigues and Dean 2014; Weller 2020).

Identification. Green with a white belly and coppery upperparts.

Amazilia tzacatl (de la Llave, 1833), Rufous-tailed Hummingbird

Figure 4J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 27 (Supplemental Table S37); stations: 1, 12, 15, 16, 18, 19, 20, 27, 28, 30, and 37, and trails: BA, CB, GA, JI, PR, and RI; 14.III.2016 to 14.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Green with a red and black bill, bluish green throat, and rufous tail.

Rallidae

Aramides cajaneus (Müller, 1776), Gray-cowled Wood-Rail

Figure 4K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S38); station: E1; 15.VII.2017; type: CT; voucher: CT. Occasionally seen on road leading to reserve.

Fregatidae

Fregata magnificens (Mathews, 1914), Magnificent Frigatebird

Figure 4L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S39); trails: MO and PR; 10.X.2017 to 6.I.2018; type: WS and PH; voucher: PH.

Identification. Easily recognized by its distinctive shape, with long pointed wings and a long, forked tail, this is the only species of frigatebird likely to be seen in mainland Costa Rica. Although typically coastal, it is occasionally seen soaring far inland.

Ardeidae

Tigrisoma fasciatum (Such, 1825), Fasciated Tiger-Heron

Figure 4M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S40); trail: PR; 5.XI.2017; type: PH; voucher: PH. One immature individual seen several times along rocky creeks in the area in the weeks after Tropical Storm Nate, October 2017. Rarely found above 500 m a.s.l. Likely ended up in the area due to the storm; unlikely to return.

Identification. Immature individuals are nearly identical to those of the Rufescent Tiger-Heron (*Tigrisoma lineatum*), but the two species overlap only slightly in range, with Fasciated found more centrally and among the Pacific foothills between Quepos and Uvita, while Rufescent occurs in the north and east of the country.

***Bubulcus ibis* (Linnaeus, 1758), Cattle Egret**
Figure 4N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S41); trail: PR; 18.II.2014; type: PH; voucher: PH. Found in cattle pasture adjacent to reserve; occasionally wander into the reserve.

Cathartidae

***Coragyps atratus* (Bechstein, 1793), Black Vulture**
Figure 4O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 57 (Supplemental Table S42); stations: 9, 17, 19, 30, 31, and 36, and trails: CH, DV, GA, JI, PR, and RI; 10.IX.2014 to 17.III.2020; type: PC, WS, and PH; voucher: PH.

***Cathartes aura* (Linnaeus, 1758), Turkey Vulture**
Figure 4P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 40 (Supplemental Table S43); stations: 18, 27, 30, 35, and 36, and trails: BA, CH, JI, MG, MO, and PR; 12.X.2016 to 22.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Bright red head, bluish nape-band in the resident (non-migratory) subspecies *ruficollis*, two-toned underwing pattern.

Accipitridae

***Elanoides forficatus* (Linnaeus, 1758), Swallow-tailed Kite**
Figure 4Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S44); stations: 1, 12, and 28, and trails: CH, GA, JI, and PR; 4.II.2019 to 30.VII.2019; type: PC, WS, and PH; voucher: PH.

***Spizaetus ornatus* (Daudin, 1800), Ornate Hawk-Eagle (NT)**
Figures 4R, 5A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 34 (Supplemental Table S45); stations: 1, 3, 7, 12, 14, 15, 18, 28, 33, and 34, and trails: CH, GA, JI, MO, PR, and RI; 21.XI.2016 to 2.XI.2019; type: PC and WS; voucher: PH.

Identification. The adult has a black crown and crest, tawny head-side, black and white barred underparts, and banded tail (Fig. 4R). The immature has a mostly white head and underparts, with a still prominent dark crest and black and white barring on its lower flanks to thighs (Fig. 5A).

***Harpagus bidentatus* (Latham, 1790), Double-toothed Kite**
Figure 5B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S46); trail: PR; 5.II.2015; type: PH; voucher: PH.

***Accipiter bicolor* (Vieillot, 1817), Bicolored Hawk**
Figure 5C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S47); trail: MO; 27.XI.2019; type: PH; voucher: PH.

***Buteogallus urubitinga* (Gmelin, 1788), Great Black Hawk**
Figure 5D, E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S48); trail: PR; 7.I.2018; type: PH; voucher: PH.

Identification. White rump and tail band.

***Morphnarchus princeps* (Sclater, 1865), Barred Hawk**
Figure 5F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S49); station: 9, and trails: BA and PR; 12.I.2018 to 21.VIII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Gray-black head, finely barred underparts.

***Rupornis magnirostris* (Gmelin, 1788), Roadside Hawk**
Figure 5G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S50); trail: PR; 27.I.2018; type: PH; voucher: PH.

***Buteo platypterus* (Vieillot, 1823), Broad-winged Hawk**
Figure 5H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3 (Supplemental Table S51); station: 17, and trails: PR and WF; 4.XII.2017 to 3.II.2020; type: PC, WS, and PH; voucher: PH.

***Buteo brachyurus* (Vieillot, 1816), Short-tailed Hawk**
Figure 5I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S52); station: 7, and trail: MO; 11.XII.2017 to 18.II.2018; type: PC and PH; voucher: PH.

Identification. White bases to the outer primaries, darker secondaries, dark tips to the flight feathers, banded tail. The dark morph (Fig. 5I) has dark brown underparts and

Figure 5. Birds of Cloudbridge. **A.** *Spizaetus ornatus*, immature. **B.** *Harpagus bidentatus*. **C.** *Accipiter bicolor*. **D-E.** *Buteogallus urubitinga*. F. *Morphnarchus princeps*. **G.** *Rupornis magnirostris*. **H.** *Buteo platypterus*. **I.** *Buteo brachyurus*. **J.** *Buteo jamaicensis*. **K.** *Megascops clarkii*. **L.** *Ciccaba virgata*, adult. **M.** *C. virgata*, immature. **N.** *Pharomachrus mocinno*, male. **O.** *P. mocinno*, female. **P.** *Trogon collaris*, male. **Q.** *T. collaris*, female. **R.** *Momotus lessonii*. Photos by: L. Allnatt (D, E, F, H, R), R. Andrews (A, J, M), L. Hulbert (C), É. Roy (K, L), M. Smokoska (B, O), J. Slifkin (P), and F. Spooner (G, I, N, Q).

underwing coverts, whereas the pale morph has white underparts and underwing coverts.

***Buteo jamaicensis* (Gmelin, 1788), Red-tailed Hawk**
Figure 5J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S53); stations: 5, 20, 25, and 27, and trails: DV, JI, MO, PR, and VR; 28.IV.2016 to 26.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The resident subspecies *costaricensis*, endemic to the highlands of Costa Rica and western Panamá, has a rufescent lower belly and flanks (Fig. 5J). Migrant birds may occur in the reserve, but they have not been definitively documented.

Strigidae

***Megascops clarkii* (Kelso & Kelso, 1935), Bare-shanked Screech-Owl**
Figure 5K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 72 (Supplemental Table S54); stations: 3, 5, 7, 9, 12, 28, and 34, and trails: CH and MO; 11.III.2016 to 17.III.2020; type: PC, WS, and CP; voucher: PH; endemic: Eh-c (Garrigues and Dean 2014). Recorded 4 times during diurnal surveys.

Identification. Brown facial disk without a distinct border, streaky brown and white underparts. Call consists of evenly spaced *whu, whu, whu, whu,* with emphasis on the second or third note.

***Ciccaba virgata* (Cassin, 1849), Mottled Owl**
Figure 5L, M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 188 (Supplemental Table S55); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 27, 28, 30, 31, 33, and 34, and trail: PR; 8.III.2016 to 24.I.2020; type: PC, CP, and PH; voucher: PH. Immature birds commonly seen/heard around the reserve buildings during July and August.

Identification. Round head, dark irises, yellow-green bill, mottled brown breast, streaked underparts (Fig. 5L). Figure 5M shows a young bird, retaining some downy plumage. Call consists of deep, slow, muffled notes, followed by two loud notes, and an additional muffled note: *whu, whu, WHUU, WHUU, whu*.

Trogonidae

***Pharomachrus mocinno* (de la Llave, 1932), Resplendent Quetzal (NT)**
Figure 5N, O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 84 (Supplemental Table S56); stations: 5, 7, 9, 12, 14, 15, 17, 18, 19, 20, 26, 31, 32, 33, 34, and 38, and trails: CH, DV, GA, HE, JI, MG, MO, PR, RI, VR, and WS; 25.II.2014 to 17.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is bluish-green with a bristly head, yellow bill, black wings, and elongated uppertail coverts (Fig. 5N). The female has a duller green head and breast, usually a blackish bill, and shorter uppertail coverts that do not extend past the tail (Fig. 5O).

***Trogon collaris* (Vieillot, 1817), Collared Trogon**
Figure 5P, Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 223 (Supplemental Table S57); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, 37, 38, and 39, and trails: AM, BA, CG, CH, DV, GA, HC, HE, JI, LQ, MO, PR, RI, SE, VR, and WS; 28.III.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is green with a dark face, yellow bill, grayish orbital ring, white breastband, red belly, and black and white barred undertail (Fig. 5P). The female is brown and has a white eye-ring and plainer undertail (Fig. 5Q). The subspecies *puella* is present at Cloudbridge; the orange-bellied subspecies *aurantiiventris* has been reported but not confirmed.

Momotidae

***Momotus lessonii* (Lesson, 1942), Lesson's Motmot**
Figure 5R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 130 (Supplemental Table S58); stations: 1, 5, 12, 15, 16, 17, 19, 28, 30, 31, 34, 35, E7, E8, I1, and S2, and trails: BA, CH, GA, HE, JI, LQ, MO, PR, RI, SE, WS, and WF; 25.III.2016 to 20.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Capitonidae

***Eubucco bourcierii* (Lafresnaye, 1845), Red-headed Barbet**
Figure 6A, B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 547 (Supplemental Table S59); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 22, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 17.III.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has a red head and upper breast, black lores, and white hindcollar (Fig. 6A), while the female has a more extensive black forehead, bluish earpatch, and golden-orange border to its face and throat (Fig. 6B).

Ramphastidae

***Aulacorhynchus prasinus* (Gould, 1833), Northern Emerald-Toucanet**
Figure 6C

New records. COSTA RICA – **San José** • Cloudbridge

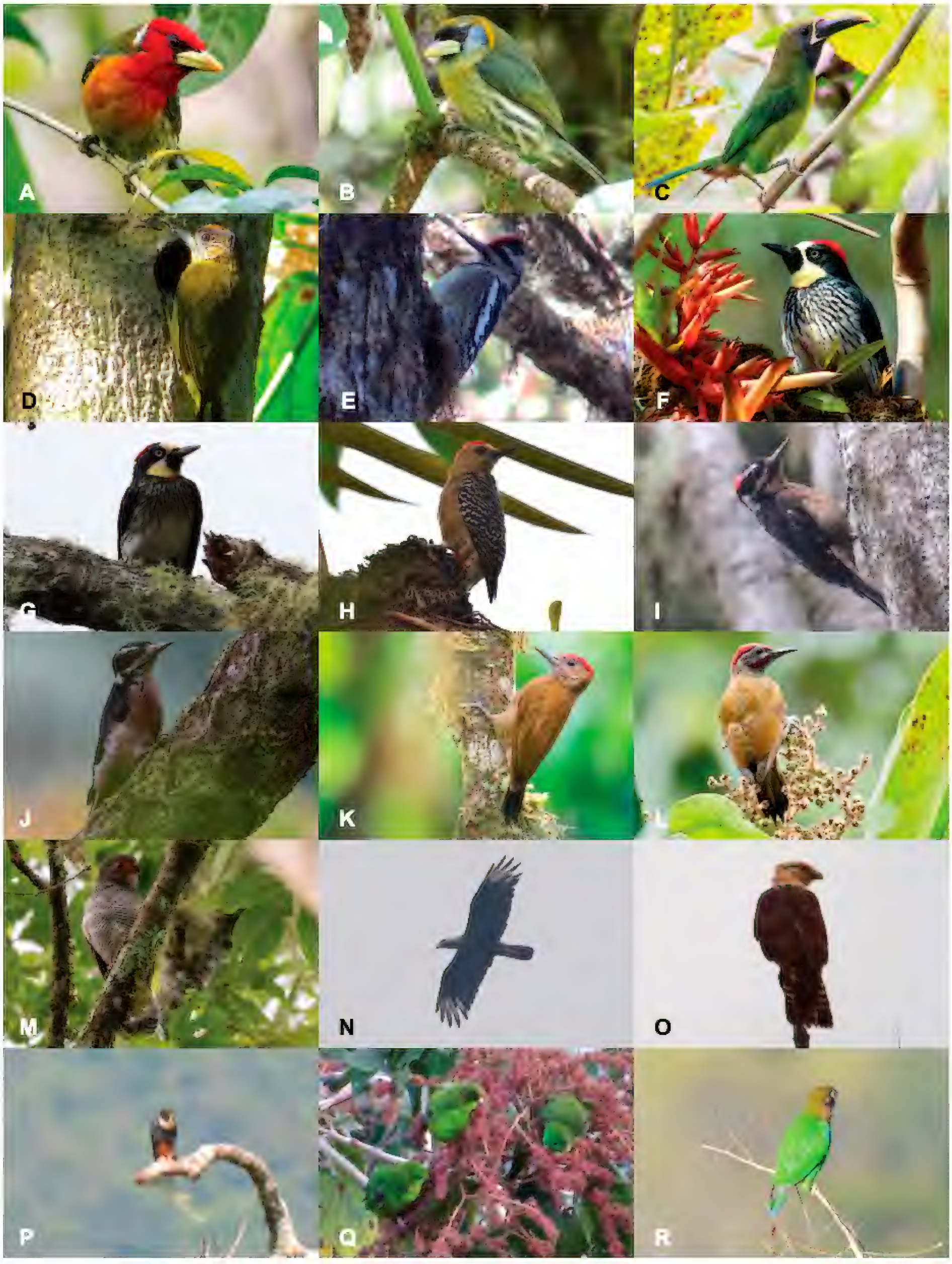

Figure 6. Birds of Cloudbridge. **A.** *Eubucco bourcierii*, male. **B.** *E. bourcierii*, female. **C.** *Aulacorhynchus prasinus*. **D.** *Picumnus olivaceus*, male. **E.** *Sphyrapicus varius*, male. **F.** *Melanerpes formicivorus*, male. **G.** *M. formicivorus*, female. **H.** *Melanerpes rubricapillus*, male. **I.** *Dryobates villosus*, male. **J.** *D. villosus*, female. **K.** *Dryobates fumigatus*, male. **L.** *Colaptes rubiginosus*, male. **M.** *Micrastur ruficollis*. **N.** *Caracara cheriway*. **O.** *Milvago chimachima*. **P.** *Falco rufigularis*. **Q.** *Bolborhynchus lineola*. **R.** *Pyrilia haematotis*. Photos by: L. Allnatt (D, E, F, Q), R. Andrews (A, B, C, J, L, M), J. Slifkin (G, I, N), M. Smokoska (O), Frank Spooner (H, P, R), and L. Valverde (K).

Nature Reserve; 1156 (Supplemental Table S60); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, E9, and G4, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 17.III.2016 to 20.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Picidae

***Picumnus olivaceus* (Lafresnaye, 1845), Olivaceous Piculet**
Figure 6D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 9 (Supplemental Table S61); station: 33, and trails: HE, JI, LQ, and PR; 27.VII.2017 to 22.VII.2019; type: PC, WS, and PH; voucher: PH.

***Sphyrapicus varius* (Linnaeus, 1766), Yellow-bellied Sapsucker**
Figure 6E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S62); trails: CH and GA; 10.I.2018; type: WS and PH; voucher: PH.

***Melanerpes formicivorus* (Swainson, 1827), Acorn Woodpecker**
Figure 6F, G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 30 (Supplemental Table S63); stations: 3, 9, 14, 15, and 28, and trails: CH, DV, JI, MO, PR, and VR; 14.III.2016 to 26.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Black and yellowish-white facial pattern. Both sexes have a red hindcrown, but in the female it is separated from the yellowish-white forehead by a black band (Fig. 6G).

***Melanerpes rubricapillus* (Cabanis, 1862), Red-crowned Woodpecker**
Figure 6H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 10 (Supplemental Table S64); trails: BA, CH, GA, JI, MO, PR, and SE; 17.X.2016 to 15.VII.2019; type: WS and PH; voucher: PH.

Identification. Black and white above, grayish-buff below, with a red to red-orange nape and belly patch. The crown is red to red-orange in the male (Fig. 6H), grayish-buff in the female.

***Dryobates villosus* (Linnaeus, 1766), Hairy Woodpecker**
Figure 6I, J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 112 (Supplemental Table S65); stations: 1, 5, 7, 9, 12, 14, 16, 30, 32, 33, 34, and M8, and trails: CH, DV, GA, HE, JI, MO, PR, and RI; 23.III.2016 to 25.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. Black and white with buffy underparts; the male has a red hindcrown patch (Fig. 6I).

***Dryobates fumigatus* (Orbigny, 1840), Smoky-brown Woodpecker**
Figure 6K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 7 (Supplemental Table S66); stations: 17 and 28, and trails: HE and JI; 5.IX.2017 to 25.IV.2021; type: PC, WS, and PH; voucher: PH.

Identification. Uniformly brown; the male has a red hindcrown (Fig. 6K).

***Colaptes rubiginosus* (Swainson, 1820), Golden-olive Woodpecker**
Figure 6L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 32 (Supplemental Table S67); stations: 5, 20, 27, 28, 30, 31, 32, 37, and 38, and trails: BA, CH, GA, HE, JI, MO, PR, and VR; 6.IX.2016 to 25.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Golden-olive above with a pale face, red malar stripe (in the male) (Fig. 6L), and streaked throat.

Falconidae

***Micrastur ruficollis* (Vieillot, 1817), Barred Forest-Falcon**
Figure 6M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 11 (Supplemental Table S68); stations: 1, 9, and 14, and trails: CH, GA, JI, LQ, and RI; 18.VIII.2017 to 13.IX.2019; type: PC and WS; voucher: PH.

***Caracara cheriway* (Jacquin, 1784), Crested Caracara**
Figure 6N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S69); trail: PR; 23.V.2019; type: PH; voucher: PH.

Identification. Dark cap, orange facial skin, dark wings with pale patches at the bases of the outer primaries.

***Milvago chimachima* (Vieillot, 1816), Yellow-headed Caracara**
Figure 6O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 7 (Supplemental Table S70); stations: 14 and 30, and trails: GA and HE; 15.IV.2015 to 1.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Yellowish head, dark postocular line, orange orbital skin.

***Falco rufigularis* (Daudin, 1800), Bat Falcon**
Figure 6P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S71); stations: 9, 14, and 28, and trails: JI and MO; 17.VIII.2016 to 7.IX.2019; type: PC, WS, and PH; voucher: PH.

Identification. Distinguishable from Orange-breasted Falcon (*Falco deiroleucus*) (which is no longer known to occur in Costa Rica; Berry et al. 2009), by its smaller size, slighter build, smaller bill and talons, more uniformly colored throat and breast, and broader black midsection with finer barring.

Psittacidae

***Bolborhynchus lineola* (Cassin, 1853), Barred Parakeet**
Figure 6Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 298 (Supplemental Table S72); stations: 1, 3, 5, 9, 16, 17, 18, 27, 28, and 30, and trails: GA, HE, JI, PR, and RI; 25.XII.2017 to 17.X.2019; type: PC, WS, and PH; voucher: PH.

Identification. Plain green, brighter below, dark at wing-bend. The eponymous barring is fine and difficult to observe.

***Pyrilia haematotis* (Sclater & Salvin, 1860), Brown-hooded Parrot**
Figure 6R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 128 (Supplemental Table S73); stations: 1, 5, 14, 16, 17, 18, 19, 20, 27, 28, 30, 32, 34, and 35, and trails: CH, GA, HE, JI, MG, MO, PR, RI, SE, and VR; 24.I.2018 to 21.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Green with a golden-brownish head, red ear-patch, white orbital skin, and blue at wing edge and tail tip.

***Pionus senilis* (Spix, 1824), White-crowned Parrot**
Figure 7A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 63 (Supplemental Table S74); stations: 18, 36, and 38, and trails: JI, MO, PR, RI, and VR; 8.XI.2016 to 10.VI.2019; type: PC, WS, and PH; voucher: PH.

Identification. Dark blue head and breast, pink-red orbital skin, white forecrown and throat patch.

***Pyrrhura hoffmanni* (Cabanis, 1861), Sulphur-winged Parakeet**
Figure 7B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2854 (Supplemental Table S75); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, and 38, and trails: BA, CG, CB, CH, DV, GA, HE, JI, MG, MO, PR, RI, SE, VR, WS, and WF; 18.III.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Mostly green with a red ear-patch, white eye-ring, yellowish-marked neck and breast, and long tail. In flight, conspicuous yellow underwing.

Thamnophilidae

***Myrmotherula schisticolor* (Lawrence, 1865), Slaty Antwren**
Figure 7C, D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 133 (Supplemental Table S76); stations: 1, 5, 7, 12, 14, 15, 16, 18, 20, 27, 31, 33, 34, 36, 37, 38, and 39, and trails: CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, and WS; 7.IV.2016 to 28.V.2020; type: PC and WS; voucher: PH.

Identification. The male is dark gray with a black throat and upper breast and darker, white-marked wing coverts (Fig. 7C). The female is grayish above with brown wings and paler brown underparts (Fig. 7D). May be confused with Dusky Antbird (*Cercomacra tyrannina*), but the latter is more uniformly gray (in the male) or more strongly brown and rufous (in the female), and is larger with a longer tail.

Grallariidae

***Grallaria guatimalensis* (Prevost & Des Murs, 1842), Scaled Antpitta**
Figure 7E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 6 (Supplemental Table S77); station: 35 and trails: CG, HE, MO, PR, and WF; 13.II.2015 to 3.IV.2019; type: PC, WS, and PH; voucher: PH.

Identification. Streaky-looking throat, dark collar, plain ochraceous underparts.

Rhinocryptidae

***Scytalopus argentifrons* (Ridgway, 1891), Silvery-fronted Tapaculo**
Figure 7F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 34 (Supplemental Table S78); stations: 9, 16, 35, and 37, and trails: CH, DV, GA, HE, MO, PR, RI, SE, and VR; 17.X.2016 to 23.IV.2020; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. Costa Rica's only tapaculo. The male is gray-black with a silvery brow (Fig. 7F), the female more brown. More often heard than seen; recognizable by its loud staccato voice.

Furnariidae

***Sclerurus mexicanus* (Sclater, 1857), Tawny-throated Leaftosser**
Figure 7G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 27 (Supplemental Table S79); stations: 32, 34, and 36, and trails: DV, GA, HE, JI, LQ, MO, PR, and RI; 29.VIII.2017 to 13.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Long bill, short tail, tawny throat.

***Sittasomus griseicapillus* (Vieillot, 1818), Olivaceous Woodcreeper**
Figure 7H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 20 (Supplemental Table S80); stations: 12, 14, 15, 34, and 38, and trails: CH, DV, GA, JI, MO, and PR; 14.III.2016 to 7.V.2020; type: PC, WS, and PH; voucher: PH.

***Glyphorynchus spirurus* (Vieillot, 1819), Wedge-billed Woodcreeper**
Figure 7I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 14 (Supplemental Table S81); stations: 12, 25, 33, and 34, and trails: GA, HC, JI, MO, and PR; 6.III.2007 to 29.IV.2020; type: PC, WS, and PH; voucher: PH.

***Campylorhamphus pusillus* (Sclater, 1860), Brown-billed Scythebill**
Figure 7J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 19 (Supplemental Table S82); station: 28, and trails: CH, DV, GA, HE, JI, and MO; 12.IX.2016 to 18.III.2020; type: PC and WS; voucher: PH.

***Lepidocolaptes affinis* (Lafresnaye, 1839), Spot-crowned Woodcreeper**
Figure 7K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 491 (Supplemental Table S83); stations: 1, 5, 7, 9, 12, 14, 15, 16, 17, 19, 20, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, and 38, and trails: AM, CH, DV, GA, HC, HE, JI, LQ, MO, PR, RI, SE, VR, WS, and WF; 23.III.2016 to 19.V.2020; type: PC and WS; voucher: PH.

Identification. Whitish throat, fine spotting on crown, streaky face, upper back, and underparts. Best distinguished from the similar Streak-headed Woodcreeper (*Lepidocolaptes souleyetii*), which is typically found at lower elevations, by its pale gray (rather than pale pinkish) bill.

***Xenops rutilans* (Temminck, 1821), Streaked Xenops**
Figure 7L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 47 (Supplemental Table S84); stations: 1, 5, 15, 16, 18, 19, 27, 30, 32, 33, 34, and 38, and trails: CH, DV, GA, HE, JI, MO, PR, and RI; 14.X.2016 to 23.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Short upturned bill, buffy supercilium, white malar stripe, streaked underparts.

***Pseudocolaptes lawrencii* (Ridgway, 1878), Buffy Tuftedcheek**
Figure 7M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S85); stations: 7 and 9, and trails: CH, GA, and MO; 12.IX.2016 to 15.VII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Flared-out buffy cheek, double wing-bar.

***Philydor rufum* (Vieillot, 1818), Buff-fronted Foliage-gleaner**
Figure 7N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 16 (Supplemental Table S86); stations: 1 and 12, trails: DV, GA, HE, JI, MO, PR, and RI; 15.II.2019 to 29.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Bright ochraceous supercilium and throat to upper breast, bright rufous wings, pale silvery bill.

***Anabacerthia variegaticeps* (Sclater, 1857), Scaly-throated Foliage-gleaner**
Figure 7O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 20 (Supplemental Table S87); stations: 5, 7, 14, 15, 30, and 34, and trails: CH, GA, HE, JI, and MO; 16.II.2017 to 16.III.2020; type: PC and WS; voucher: PH.

Identification. Rufous-orange eye-ring and postocular line.

***Syndactyla subalaris* (Sclater, 1859), Lineated Foliage-gleaner**
Figure 7P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 146 (Supplemental Table S88); stations: 1, 5, 7, 12, 16, 18, 20, 27, 30, 31, 33, 36, and 38, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, and VR; 29.IV.2016 to 24.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Brown with a pale buffy throat and fine buffy streaks on its face and underparts.

***Thripadectes rufobrunneus* (Lawrence, 1865), Streak-breasted Treehunter**
Figure 7Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 50 (Supplemental Table S89); stations: 1, 5, 7, 9, 12, 20, 30, 35, 38, and 39, and trails: BA, CH, GA, HE, JI, MO, PR, and VR; 23.III.2016 to 7.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Dark crown, ochraceous throat, streaked underparts.

***Premnoplex brunnescens* (Sclater, 1856), Spotted Barbtail**
Figure 7R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 283 (Supplemental Table S90); stations: 1, 3, 5, 7, 9, 12, 16, 17, 18, 19, 20, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 1.VIII.2016 to 12.V.2020; type: PC, WS, and PH; voucher: PH.

Figure 7. Birds of Cloudbridge. **A.** *Pionus senilis*. **B.** *Pyrrhura hoffmanni*. **C.** *Myrmotherula schisticolor*, male. **D.** *M. schisticolor*, female. **E.** *Grallaria guatimalensis*. **F.** *Scytalopus argentifrons*, male. **G.** *Sclerurus mexicanus*. **H.** *Sittasomus griseicapillus*. **I.** *Glyphorynchus spirurus*. **J.** *Campylorhamphus pusillus*. **K.** *Lepidocolaptes affinis*. **L.** *Xenops rutilans*. **M.** *Pseudocolaptes lawrencii*. **N.** *Philydor rufum*. **O.** *Anabacerthia variegaticeps*. **P.** *Syndactyla subalaris*. **Q.** *Thripadectes rufobrunneus*. **R.** *Premnoplex brunnescens*. Photos by: L. Allnatt (M), R. Andrews (C, D, H, N, R), L. Kahn (A, B), N. Marcy (I), J. Slifkin (F, G, J, K, L, O, P, Q), and M. Smokoska (E).

Identification. Dark brown with small buffy spots on its face, crown, and underparts and a black-scalloped back.

***Margarornis rubiginosus* (Lawrence, 1865), Ruddy Treerunner**
Figure 8A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 31 (Supplemental Table S91); stations: 5, 7, 9, 12, 19, 34, and 36, and trails: CH, DV, GA, HE, JI, MO, PR, and RI; 19.X.2016 to 12.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Strongly reddish brown, woodcreeper-like but with a shorter bill, with a white throat and supercilium and diffuse pale markings on its breast.

***Cranioleuca erythrops* (Sclater, 1860), Red-faced Spinetail**
Figure 8B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 331 (Supplemental Table S92); stations: 1, 5, 7, 12, 14, 15, 16, 17, 18, 20, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 18.III.2016 to 21.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Rufous face, wings, and tail, orange-brown iris, bicolored bill.

Tityridae

***Tityra semifasciata* (Spix, 1825), Masked Tityra**
Figure 8C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 61 (Supplemental Table S93); stations: 1, 14, 15, 17, 18, 19, 30, 31, 32, 35, 36, and 37, and trails: BA, CH, GA, HE, JI, MO, PR, and RI; 3.VIII.2016 to 28.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is mostly white with a black mask, black-tipped red bill, red facial skin, and black in its wings and tail. The individual shown in Figure 8C may be a young bird, with traces of brown on its face and upperparts. The female lacks a distinct black mask and has a brownish head and grayer upperparts.

***Pachyramphus versicolor* (Hartlaub, 1843), Barred Becard**
Figure 8D, E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 86 (Supplemental Table S94); stations: 1, 9, 16, 18, 20, 30, 32, 33, 36, 38, and 39, and trails: BA, DV, GA, HE, JI, LQ, MO, PR, RI, and SE; 8.IV.2016 to 28.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has a black cap and back, black and white wings, yellowish face, and barred underparts (Fig. 8D). The female is similar, but with a grayer cap, green back, and rufous-brown wings (Fig. 8E).

***Pachyramphus albogriseus* (Sclater, 1857), Black-and-white Becard**
Figure 8F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 20 (Supplemental Table S95); stations: 14, 17, 25, 28, 30, 31, 32, 33, and 36, and trails: BA, CH, GA, MO, PR, RI, and WF; 15.IV.2016 to 27.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has a black cap, white supraloral line, white underparts, and graduated tail with white tips (Fig. 8F). The female is more olive above and yellower below, with a chestnut cap with black borders.

Tyrannidae

***Platyrinchus mystaceus* (Vieillot, 1818), White-throated Spadebill**
Figure 8G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 7 (Supplemental Table S96); station: 16, and trails: CH, GA, JI, MO, and RI; 11.IX.2017 to 11.VII.2019; type: PC, WS, and PH; voucher: PH.

Identification. A small, proportionally large-headed flycatcher with a brown and buff facial pattern and white throat. This species is nearly identical to the Stub-tailed Spadebill (*Platyrinchus cancrominus*), but the latter does not occur in the Talamanca range.

***Mionectes olivaceus* (Lawrence, 1868), Olive-striped Flycatcher**
Figure 8H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 81 (Supplemental Table S97); stations: 1, 12, 14, 17, 18, 19, 20, 22, 27, 28, 31, 33, 35, 36, and 39, and trails: GA, HC, HE, JI, MG, PR, RI, WS, and WF; 23.II.2007 to 3.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Olive-green with a white postocular triangle, slim bill with a pale orange base to the lower mandible, and streaky underparts.

***Leptopogon superciliaris* (Tschudi, 1844), Slaty-capped Flycatcher**
Figure 8I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 77 (Supplemental Table S98); stations: 1, 3, 16, 17, 18, 20, 27, 31, 33, 34, 36, 37, and 38, and trails: BA, DV, GA, HE, JI, LQ, MG, MO, PR, RI, and WS; 25.III.2016 to 19.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Green above and yellowish below with a pale gray face, contrastingly dark gray crown and ear-patch, and yellow wing-bars.

***Lophotriccus pileatus* (Tschudi, 1844), Scale-crested Pygmy-Tyrant**
Figure 8J

Figure 8. Birds of Cloudbridge. **A.** *Margarornis rubiginosus*. **B.** *Cranioleuca erythrops*. **C.** *Tityra semifasciata*, male. **D.** *Pachyramphus versicolor*, male. **E.** *P. versicolor*, female. **F.** *Pachyramphus albogriseus*, male. **G.** *Platyrinchus mystaceus*. **H.** *Mionectes olivaceus*. **I.** *Leptopogon superciliaris*. **J.** *Lophotriccus pileatus*. **K.** *Rhynchocyclus brevirostris*. **L.** *Tolmomyias sulphurescens*. **M.** *Elaenia flavogaster*. **N.** *Elaenia frantzii*. **O.** *Serpophaga cinerea*. **P.** *Phyllomyias burmeisteri*. **Q.** *Zimmerius parvus*. **R.** *Mitrephanes phaeocercus*. Photos by: R. Andrews (F, G, K, P), N. Marcy (H), J. Roth (A), J. Slifkin (B, C, D, E, I, J, L, N, O, Q, R), and F. Spooner (M).

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 33 (Supplemental Table S99); stations: 17, 27, 28, 34, and 38, and trails: CH, GA, HE, JI, and MO; 23.X.2016 to 21.XII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Rufous-tipped black crest feathers.

***Rhynchocyclus brevirostris* (Cabanis, 1847), Eye-ringed Flatbill**
Figure 8K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 34 (Supplemental Table S100); stations: 15, 16, 30, 31, 33, 34, 37, and 38, and trails: CH, DV, GA, HE, JI, PR, RI, SE, and WS; 31.VIII.2016 to 15.V.2020; type: PC and WS; voucher: PH.

Identification. Plain olive with a prominent pale eye-ring, dark eye, and broad bicolored bill.

***Tolmomyias sulphurescens* (Spix, 1825), Yellow-olive Flycatcher**
Figure 8L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 5 (Supplemental Table S101); trails: BA, CG, HE, MG, and WS; 14.IV.2019 to 19.XII.2019; type: WS and PH; voucher: PH.

Identification. Gray crown and face, whitish iris, narrow whitish eye-ring and supraloral line, broad bicolored bill, olive-green upperparts, pale yellow belly.

***Elaenia flavogaster* (Thunberg, 1822), Yellow-bellied Elaenia**
Figure 8M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S102); station: 38, and trail: HE; 18.II.2018 to 12.VII.2018; type: PC and PH; voucher: PH.

Identification. Gray-white throat and breast, pale yellowish belly, tall, centrally parted crest.

***Elaenia frantzii* (Lawrence, 1865), Mountain Elaenia**
Figure 8N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 64 (Supplemental Table S103); stations: 3, 5, 7, 9, 14, 15, 16, 17, 27, 28, and 33, and trails: CH, DV, GA, HE, JI, LQ, MO, PR, RI, and VR; 30.III.2016 to 5.V.2020; type: PC and WS; voucher: PH.

Identification. Olive-gray with a rounded head, pale orange base to its lower mandible, and pale wingbars and wing-edging. Also recognizable by its down-slurred two-tone call.

***Serpophaga cinerea* (Tschudi, 1844), Torrent Tyrannulet**
Figure 8O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 54 (Supplemental Table S104); station: 19, and trails: AM, DV, LQ, MG, PR, RI, and WF; 1.IX.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Gray with a blackish head, wings, and tail. Commonly and exclusively found along rocky montane streams.

***Phyllomyias burmeisteri* (Cabanis & Heine, 1859), Rough-legged Tyrannulet**
Figure 8P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3 (Supplemental Table S105); station: 17, and trails: JI and MO; 21.IV.2016 to 8.VII.2019; type: PC, WS, and PH; voucher: PH.

Identification. Green upperparts, gray crown, white superciliaries, yellow-green underparts, double yellow wingbar, pale lower mandible.

***Zimmerius parvus* (Lawrence, 1862), Mistletoe Tyrannulet**
Figure 8Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 314 (Supplemental Table S106); stations: 1, 3, 5, 9, 12, 14, 15, 16, 17, 18, 19, 20, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, and 36, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WS; 14.III.2016 to 24.IV.2020; type: PC and WS; voucher: PH.

Identification. Short bill, green upperparts, gray crown, yellow wing-edging but no wingbars. Also recognizable by its whistled two-note call.

***Mitrephanes phaeocercus* (Sclater, 1859), Tufted Flycatcher**
Figure 8R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 282 (Supplemental Table S107); stations: 5, 7, 9, 12, 14, 15, 17, 19, 20, 24, 25, 28, 31, 34, 36, 38, and 39, and trails: BA, CH, DV, GA, HC, HE, JI, LQ, MG, MO, PR, RI, VR, and WS; 24.III.2016 to 27.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Olive-brown crest and back, ochraceous face and breast. Distinguishable from Ochraceous Pewee (*Contopus ochraceus*) by its smaller size, shorter bill, and voice, a rapid series of sharp, high notes.

***Contopus cooperi* (Nuttall, 1831), Olive-sided Flycatcher (NT)**
Figure 9A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 29 (Supplemental Table S108); stations: 3, 17, 18, 19, 24, 25, 26, 32, and 33, and trails: CH, DV, HE, JI, MO, PR, and RI; 16.IX.2016 to 28.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Dark olive-gray with dark flanks separated by white central underparts.

***Contopus lugubris* (Lawrence, 1865), Dark Pewee**
Figure 9B

Figure 9. Birds of Cloudbridge. **A.** *Contopus cooperi*. **B.** *Contopus lugubris*. **C.** *Contopus sordidulus*. **D.** *Empidonax flaviventris*. **E.** *Empidonax flavescens*. **F.** *Empidonax atriceps*. **G.** *Sayornis nigricans*. **H.** *Myiarchus tuberculifer*. **I.** *Pitangus sulphuratus*. **J.** *Megarynchus pitangua*. **K.** *Myiozetetes similis*. **L.** *Myiozetetes granadensis*. **M.** *Myiodynastes hemichrysus*. **N.** *Legatus leucophaius*. **O.** *Tyrannus melancholicus*. **P.** *Cyclarhis gujanensis*. **Q.** *Pachysylvia decurtata*. **R.** *Vireo flavifrons*. Photos by: L. Allnatt (D), R. Andrews (B, P), A. Greene (E), J. Roth (F, K), J. Slifkin (C, H, I, J, M, O, Q), M. Smokoska (G, L, R), and F. Spooner (A, N).

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S109); stations: 14, 19, 20, 28, and 34, and trails: DV, GA, JI, LQ, PR, and VR; 8.VIII.2016 to 5.VIII.2019; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. Plain, dark olive-gray—much darker than, for example, Western Wood-Pewee (*Contopus sordidulus*) (Fig. 9C)—with a crest and without prominent wingbars.

***Contopus sordidulus* (Sclater, 1859), Western Wood-Pewee**
Figure 9C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 11 (Supplemental Table S110); stations: 17, 24, and 32, and trails: DV, GA, HE, JI, MO, and VR; 22.IV.2016 to 17.IV.2019; type: PC, WS, and PH; voucher: PH and video with audio (ML333784071, https://macaulaylibrary.org/asset/333784071).

Identification. Best distinguished from Eastern Wood-Pewee (*Contopus virens*) and Tropical Pewee (*Contopus cinereus*) by its voice, a shorter, "burrier," less rising *pee-wee* than that given by the Eastern Wood-Pewee.

***Empidonax flaviventris* (Baird & Girard, 1843), Yellow-bellied Flycatcher**
Figure 9D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 67 (Supplemental Table S111); stations: 3, 14, 15, 17, 19, 20, 27, 28, 30, 31, 32, 33, and 34, and trails: BA, DV, GA, HE, JI, MG, MO, PR, and RI; 15.III.2016 to 18.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Olive-gray with pale yellowish underparts, but best distinguished from its congeners by its voice, a rising two-note whistle.

***Empidonax flavescens* (Lawrence, 1865), Yellowish Flycatcher**
Figure 9E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 363 (Supplemental Table S112); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 33, 34, 36, and 39, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, and VR; 14.III.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Strongly ochraceous.

***Empidonax atriceps* (Salvin, 1870), Black-capped Flycatcher**
Figure 9F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 33 (Supplemental Table S113); stations: 3, 15, 22, 28, and 34, and trails: BA, CH, DV, JI, MO, RI, VR, and WF; 8.VIII.2016 to 7.I.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Gray with a black cap.

***Sayornis nigricans* (Swainson, 1827), Black Phoebe**
Figure 9G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 13 (Supplemental Table S114); stations: 14, 16, and 26, and trails: AM, BA, CB, CH, GA, HE, JI, PR, RI, SE, and WS; 23.I.2014 to 24.V.2019; type: PC, WS, and PH; voucher: PH.

***Myiarchus tuberculifer* (Orbigny & Lafresnaye, 1837), Dusky-capped Flycatcher**
Figure 9H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 143 (Supplemental Table S115); stations: 1, 3, 14, 15, 16, 17, 18, 20, 26, 27, 28, 30, 31, 32, 33, and 38, and trails: CH, DV, GA, HE, JI, MO, PR, RI, and SE; 7.IV.2016 to 20.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Best distinguished from its congeners by its contrastingly dark crown.

***Pitangus sulphuratus* (Linnaeus, 1766), Great Kiskadee**
Figure 9I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 67 (Supplemental Table S116); stations: 1, 3, 14, 15, 17, 18, 19, 20, 25, 28, 30, 32, 36, 37, and 38, and trails: BA, CH, DV, GA, JI, MO, PR, RI, SE, and WF; 17.III.2016 to 20.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Larger with a much larger bill than similarly patterned *Myiozetetes* flycatchers. Distinguishable from the Boat-billed Flycatcher (*Megarynchus pitangua*) (Fig. 9J) by its smaller bill, browner (less olive) upperparts, and more extensively rufous wings and tail.

***Megarynchus pitangua* (Linnaeus, 1766), Boat-billed Flycatcher**
Figure 9J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 151 (Supplemental Table S117); stations: 1, 3, 9, 15, 16, 17, 18, 19, 20, 27, 28, 30, 32, 35, and 38, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, and WF; 7.IV.2016 to 29.V.2020; type: PC and WS; voucher: PH.

Identification. Heavy bill with a decurved culmen.

***Myiozetetes similis* (Spix, 1825), Social Flycatcher**
Figure 9K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 10 (Supplemental Table S118); stations: 14 and 32, and trails: HE, JI, PR, and RI; 29.XI.2017 to 23.I.2020; type: PC and WS; voucher: PH.

***Myiozetetes granadensis* (Lawrence, 1862), Gray-capped Flycatcher**
Figure 9L

New records. COSTA RICA – **San José** • Cloudbridge

Nature Reserve; 3 (Supplemental Table S119); trails: GA, PR, and SE; 14.I.2015 to 25.X.2016; type: WS and PH; voucher: PH.

Identification. Best distinguished from Social Flycatcher (*Myiozetetes similis*) (Fig. 9K) by its gray crown and nape and shorter white supercilium that tapers away behind its eye.

***Myiodynastes hemichrysus* (Cabanis, 1861), Golden-bellied Flycatcher**

Figure 9M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 215 (Supplemental Table S120); stations: 1, 5, 9, 14, 16, 17, 18, 19, 20, 22, 24, 26, 27, 28, 30, 31, 32, 33, 35, and 37, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, and WF; 18.III.2016 to 7.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Dark brown lateral throat stripe.

***Legatus leucophaius* (Vieillot, 1818), Piratic Flycatcher**

Figure 9N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3 (Supplemental Table S121); trails: PR and LQ; 18.II.2018 to 13.IX.2019; type: WS and PH; voucher: PH.

***Tyrannus melancholicus* (Vieillot, 1819), Tropical Kingbird**

Figure 9O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 16 (Supplemental Table S122); stations: 17, 19, and 30, and trails: BA, CH, DV, GA, JI, MO, PR, RI, and SE; 15.III.2016 to 5.VIII.2019; type: PC, WS, and PH; voucher: PH.

Vireonidae

***Cyclarhis gujanensis* (Gmelin, 1789), Rufous-browed Peppershrike**

Figure 9P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 174 (Supplemental Table S123); stations: 1, 3, 5, 7, 9, 14, 15, 16, 17, 18, 20, 24, 27, 28, 30, 36, and 39, and trails: AM, CG, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, and WS; 14.IV.2016 to 29.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Gray face, strong bill, broad rufous supercilium, pale green upperparts, yellow and white underparts.

***Pachysylvia decurtata* (Bonaparte, 1838), Lesser Greenlet**

Figure 9Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 34 (Supplemental Table S124); stations: 7, 12, 14, 15, 20, 30, 33, 36, 37, and 38, and trails: BA, DV, GA, HE, JI, RI, and WS; 23.VIII.2016 to 28.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Pale gray-blue head, white eye-ring and supraloral line, bright olive-green upperparts, yellow-green flanks.

***Vireo flavifrons* (Vieillot, 1808), Yellow-throated Vireo**

Figure 9R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 67 (Supplemental Table S125); stations: 1, 3, 7, 9, 14, 15, 16, 18, 20, 27, 28, 30, 33, and 35, and trails: BA, DV, GA, HE, JI, MG, MO, PR, RI, and WS; 8.IV.2016 to 19.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Bright yellow spectacles, bright yellow throat and breast, white belly.

***Vireo carmioli* (Baird, 1866), Yellow-winged Vireo**

Figure 10A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 51 (Supplemental Table S126); stations: 5, 7, 9, 14, 15, 16, 17, 18, 28, 35, and 36, and trails: CH, GA, JI, MO, PR, RI, and SE; 1.IV.2016 to 28.IV.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Greenish face and upperparts, yellow lores and subocular crescent, yellow underparts, two yellow wingbars.

***Vireo philadelphicus* (Cassin, 1851), Philadelphia Vireo**

Figure 10B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 363 (Supplemental Table S127); stations: 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 27, 28, 30, 31, 32, 33, 35, 36, 37, 38, and 39, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 15.III.2016 to 17.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Distinguished from Warbling Vireo (*Vireo gilvus*), a rarer migrant in Costa Rica, by its stronger eyeline, browner ear covert, and yellower throat and breast.

***Vireo leucophrys* (Lafresnaye, 1844), Brown-capped Vireo**

Figure 10C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 999 (Supplemental Table S128); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, and 38, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 14.III.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Brown cap, white throat, yellow underparts.

Figure 10. Birds of Cloudbridge. **A.** *Vireo carmioli*. **B.** *Vireo philadelphicus*. **C.** *Vireo leucophrys*. **D.** *Cyanolyca argentigula*. **E.** *Psilorhinus morio*. **F.** *Pygochelidon cyanoleuca*. **G.** *Stelgidopteryx serripennis*. **H.** *Stelgidopteryx ruficollis*. **I.** *Microcerculus marginatus*. **J.** *Troglodytes aedon*. **K.** *Troglodytes ochraceus*. **L.** *Pheugopedius rutilus*. **M.** *Cantorchilus elutus*. **N.** *Henicorhina leucophrys*. **O.** *Cinclus mexicanus*. **P.** *Myadestes melanops*. **Q.** *Catharus gracilirostris*. **R.** *Catharus aurantiirostris*. Photos by: L. Allnatt (A, L), R. Andrews (D, P), S. Daniel (F), J. Slifkin (B, C, G, I, J, K, M, N, O, R), M. Smokoska (Q), and F. Spooner (E, H).

Corvidae

***Cyanolyca argentigula* (Lawrence, 1875), Silvery-throated Jay**
Figure 10D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 38 (Supplemental Table S129); station: 9, and trails: CH, JI, and MO; 4.II.2019 to 15.VII.2019; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. Dark blue and black with a whitish throat and forehead band.

***Psilorhinus morio* (Wagler, 1829), Brown Jay**
Figure 10E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 81 (Supplemental Table S130); stations: 1, 9, 12, 17, 30, 36, 37, and M9, and trails: BA, CH, GA, HE, JI, LQ, MG, MO, PR, RI, and WC; 17.X.2016 to 7.I.2020; type: PC, WS, CT, and PH; voucher: PH.

Hirundinidae

***Pygochelidon cyanoleuca* (Vieillot, 1817), Blue-and-white Swallow**
Figure 10F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 32 (Supplemental Table S131); stations: 17 and 22, and trails: CB, DV, PR, SE, and VR; 9.I.2017 to 4.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. Dark blue above and white below with black undertail coverts.

***Stelgidopteryx serripennis* (Audubon, 1838), Northern Rough-winged Swallow**
Figure 10G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S132); trail: PR; 26.IV.2019 to 27.V.2019; type: WS and PH; voucher: PH.

***Stelgidopteryx ruficollis* (Vieillot, 1817), Southern Rough-winged Swallow**
Figure 10H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S133); trails: PR and RI; 4.II.2018 to 6.VII.2018; type: WS and PH; voucher: PH.

Identification. Distinguished from Northern Rough-winged Swallow (*Stelgidopteryx serripennis*) (Fig. 10G) by its cinnamon-rufous rather than gray-white throat.

Troglodytidae

***Microcerculus marginatus* (Sclater, 1855), Scaly-breasted Wren**
Figure 10I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 330 (Supplemental Table S134); stations: 1, 12, 15, 16, 20, 28, 30, 31, 32, 34, 35, 36, 37, and 38, and trails: AM, BA, CG, CH, DV, GA, HE, JI, MG, MO, PR, RI, SE, VR, WS, and WF; 9.IX.2016 to 28.V.2020; type: PC and WS; voucher: PH.

Identification. Dull brown with a gray-white throat and breast and dark bill with a creamy base to the lower mandible. More often heard than seen; recognizable by its loud, high-pitched whistling notes.

***Troglodytes aedon* (Vieillot, 1809), House Wren**
Figure 10J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 53 (Supplemental Table S135); stations: 17, 20, 26, 27, 31, 33, and 35, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, WS, and WF; 26.VIII.2016 to 19.III.2020; type: PC, WS, and PH; voucher: PH.

***Troglodytes ochraceus* (Ridgway, 1882), Ochraceous Wren**
Figure 10K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 108 (Supplemental Table S136); stations: 1, 5, 7, 9, 12, 14, 15, 18, 25, 26, 27, 33, and 34, and trails: BA, CH, DV, GA, HE, JI, MO, PR, and RI; 21.III.2016 to 17.III.2020; type: PC and WS; voucher: PH; endemic: Eh-ep. Occurs at Pirre in eastern Panamá and possibly into Colombia (Garrigues and Dean 2014; Kroodsma and Brewer 2020).

Identification. Distinguished from House Wren (*Troglodytes aedon*) (Fig. 10J) by its warmer buffy coloration and stronger supercilium.

***Pheugopedius rutilus* (Vieillot, 1819), Rufous-breasted Wren**
Figure 10L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 175 (Supplemental Table S137); stations: 1, 3, 5, 7, 9, 14, 17, 18, 20, 22, 26, 27, 28, 30, 32, 35, 38, and E8, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WS; 21.III.2016 to 20.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. Streaky black-and-white cheeks and throat, bright rufous-orange breast.

***Cantorchilus elutus* (Bangs, 1902), Isthmian Wren**
Figure 10M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 23 (Supplemental Table S138); stations: 3, 9, 16, and 28, and trails: BA, CH, GA, JI, MO, and PR; 23.X.2016 to 15.VII.2019; type: PC, WS, and PH; voucher: PH; endemic: El-ep. Occurs from Pacific lowlands of southern Costa Rica to eastern Panamá (Kroodsma et al. 2020).

Identification. Brown upperparts, white supercilium, white throat to upper breast, orange-buff flanks and undertail coverts. Previously (and still by some authorities) considered conspecific 1) with Cabanis's Wren (*Cantorchilus modestus*), called "Plain Wren" when considered

together, which it replaces on the Pacific slope of the southern half of Costa Rica, and 2) with Canebrake Wren (*Cantorchilus zeledoni*), which occurs on the Caribbean slope.

***Henicorhina leucophrys* (Tschudi, 1844), Gray-breasted Wood-Wren**
Figure 10N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 776 (Supplemental Table S139); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 21.III.2016 to 13.V.2020; type: PC and WS; voucher: PH.

Identification. Narrow white supercilium, black and white streaked cheeks, gray (not white) breast, brown lower flanks and upperparts.

Cinclidae

***Cinclus mexicanus* (Swainson, 1827), American Dipper**
Figure 10O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 30 (Supplemental Table S140); stations: 22 and 32, and trails: BA, CV, DV, PR, RI, SE, VR, and WF; 3.XI.2016 to 28.IV.2020; type: PC, WS, and PH; voucher: PH.

Turdidae

***Myadestes melanops* (Salvin, 1865), Black-faced Solitaire**
Figure 10P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 759 (Supplemental Table S141); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 27, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CB, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 17.III.2016 to 29.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp. Likely over-represented in the data due to audio identifications of Slaty-backed Nightingale-Thrushes (*Catharus fuscater*) recorded as Black-faced Solitaire.

Identification. Slate-gray with a black face and orange bill and feet. It is more often heard than seen and may be identified by its ethereal song that has been likened to the sound of a slowly swinging rusty gate, although care must be taken to distinguish its song from that of the Slaty-backed Nightingale-Thrush.

***Catharus gracilirostris* (Salvin, 1865), Black-billed Nightingale-Thrush**
Figure 10Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 205 (Supplemental Table S142); stations: 1, 3, 5, 9, 27, 31, 38, E8, E9, E10, E11, G4, G5, G6, I1, M7, M8, M9, R4, and S2, and trails: CH, DV, MO, and PR; 22.I.2015 to 5.V.2020; type: PC, WS, CT, and PH; voucher: PH; endemic: Eh-wp.

Identification. Gray head and underparts, brown breastband and upperparts, black bill.

***Catharus aurantiirostris* (Hartlaub, 1850), Orange-billed Nightingale-Thrush**
Figure 10R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 41 (Supplemental Table S143); stations: 1, 17, 18, E7, E11, and R4, and trails: AM, BA, HE, JI, PR, RI, WS, and WF; 9.IX.2016 to 14.IV.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. Gray head and underparts, brown upperparts, orange eye-ring, bill, and legs. Subspecies *griseiceps*, found in southwestern Costa Rica and western Panamá, has a gray crown.

***Catharus fuscater* (Lafresnaye, 1845), Slaty-backed Nightingale-Thrush**
Figure 11A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 291 (Supplemental Table S144); stations: 1, 17, 18, 19, 20, 31, 35, 37, 38, E7, E8, E9, G6, I1, M7, R4, S2, and W1, and trails: AM, BA, CI, DV, GA, HE, JI, LQ, MO, PR, RI, SE, WS, and WF; 12.XI.2016 to 28.V.2020; type: PC, WS, CT, and PH; voucher: PH. Likely underrepresented in the data due to audio identifications being recorded as Black-faced Solitaire.

Identification. Gray to gray-black with white iris, orange eye-ring, bill, and legs, and white belly. Its song is very similar to that of the Black-faced Solitaire, to the extent that playback of Black-faced Solitaire song in the reserve has been observed to attract Slaty-backed Nightingale-Thrushes, although it may be distinguishable by the harsher, less "fluty" quality to the sound.

***Catharus frantzii* (Cabanis, 1861), Ruddy-capped Nightingale-Thrush**
Figure 11B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 464 (Supplemental Table S145); stations: 1, 3, 5, 7, 9, 12, 14, 15, 20, 32, 34, 36, 37, 38, E7, E8, E9, E10, G5, G6, M7, M8, M9, R4, and S2, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, VR, and WS; 7.IV.2016 to 26.V.2020; type: PC, WS, and CT; voucher: PH.

Identification. Gray face and underparts, brown upperparts with ruddier crown, bicolored bill, no colored eye-ring.

***Catharus ustulatus* (Nuttall, 1840), Swainson's Thrush**
Figure 11C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 390 (Supplemental Table S146); stations: 1, 5, 7, 9, 14, 15, 16, 17, 18, 19, 20, 27, 28, 30, 31,

Figure 11. Birds of Cloudbridge. **A.** *Catharus fuscater.* **B.** *Catharus frantzii*. **C.** *Catharus ustulatus*. **D.** *Turdus plebejus*. **E.** *Turdus grayi*. **F.** *Ptiliogonys caudatus*, male. **G.** *P. caudatus*, female. **H.** *Chlorophonia callophrys*, male. **I.** *C. callophrys*, female. **J.** *Euphonia hirundinacea*, immature male. **K.** *Euphonia elegantissima*, male. **L.** *E. elegantissima*, female. **M.** *Euphonia imitans*, male. **N.** *E. imitans*, female. **O.** *Spinus psaltria*, female. **P.** *Spinus xanthogastrus*, male. **Q.** *S. xanthogastrus*, female. **R.** *Chlorospingus pileatus*. Photos by: L. Allnatt (C, Q), J. Roth (R), J. Slifkin (A, B, D, E, F, G, I, K, L, M, O), M. Smokoska (N), and F. Spooner (H, J, P).

32, 33, 34, 35, 36, 37, 38, E7, E8, E9, E11, G4, I1, M7, M8, R4, and W1, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, WS, and WF; 25.III.2016 to 20.V.2020; type: PC, WS, CT, and PH; voucher: PH.

***Turdus plebejus* (Cabanis, 1861), Mountain Thrush**
Figure 11D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 315 (Supplemental Table S147); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, G4, G6, M8, M9, and S2, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS; 9.IX.2016 to 3.V.2020; type: PC, WS, and CT; voucher: PH.

Identification. Plain brown with a black bill.

***Turdus grayi* (Bonaparte, 1838), Clay-colored Thrush**
Figure 11E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 106 (Supplemental Table S148); stations: 1, 7, 9, 14, 16, 17, 18, 20, 27, 28, 31, 33, 35, 37, and 39, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, WS, and WF; 17.III.2016 to 28.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Pale brown with a yellow-green bill and brown iris.

Ptiliogonatidae

***Ptiliogonys caudatus* (Cabanis, 1861), Long-tailed Silky-flycatcher**
Figure 11F, G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 216 (Supplemental Table S149); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 28, 30, and 37, and trails: CH, DV, GA, HE, JI, MO, PR, RI, and VR; 14.IX.2016 to 25.V.2020; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. The male has a yellow face, crest, eye-ring, and underparts, and a bluish-gray forehead, upperparts, and breast (Fig. 11F). The female is more uniformly olive (Fig. 11G).

Fringillidae

***Chlorophonia callophrys* (Cabanis, 1861), Golden-browed Chlorophonia**
Figure 11H, I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 163 (Supplemental Table S150); stations: 3, 5, 7, 9, 12, 14, 15, 16, 17, 20, 25, 27, 28, 32, 33, 34, 36, and 38, and trails: BA, CH, DV, GA, HE, JI, MO, PR, and RI; 15.III.2016 to 21.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. The male is bright green with a yellow brow and underparts, narrow blue hindcollar, and narrow dark breastband (Fig. 11H). The female is green with a narrow blue hindcollar, lavender-blue crown, and diffusely yellow belly (Fig. 11I).

***Euphonia hirundinacea* (Bonaparte, 1838), Yellow-throated Euphonia**
Figure 11J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S151); trail: PR; 11.I.2018; type: PH; voucher: PH.

Identification. The male is dark blue above with a yellow forecrown, throat, and underparts. The female is dull green and yellow with a gray-white belly. The male can be distinguished from Thick-billed Euphonia (*Euphonia laniirostris*) by its smaller yellow forecrown patch, not extending past its midcrown. Figure 11J shows a young male transitioning into adult plumage.

***Euphonia elegantissima* (Bonaparte, 1838), Elegant Euphonia**
Figure 11K, L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 332 (Supplemental Table S152); stations: 1, 3, 5, 14, 15, 16, 17, 18, 19, 20, 24, 25, 27, 28, 30, 31, 32, 33, 35, 36, and 37, and trails: AM, BA, CV, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, WS, and WF; 15.III.2016 to 29.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Sky-blue hood, rufous forehead patch. The male has a purple-black face, throat, and upperparts, and orange-yellow underparts (Fig. 11K). The female has olive head-sides and upperparts and a yellower throat and underparts (Fig. 11L).

***Euphonia imitans* (Hellmayr, 1936), Spot-crowned Euphonia**
Figure 11M, N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 11 (Supplemental Table S153); stations: 16, 17, and 32, and trails: BA, JI, LQ, and PR; 5.II.2015 to 5.II.2020; type: PC, WS, and PH; voucher: PH; endemic: El-wp.

Identification. The male is dark glossy blue with a blue throat, yellow underparts, and yellow forehead-patch extending back to around the rear edge of the eye and spotted or streaked inconspicuously with black (Fig. 11M). The female is mostly yellowish with a rufous forehead-patch, grayish hindcrown and mantle, and diffusely rufous-orange lower belly (Fig. 11N).

***Spinus psaltria* (Say, 1822), Lesser Goldfinch**
Figure 11O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S154); trails: GA and HE; 14.III.2018 to 15.IV.2019; type: WS and PH; voucher: PH.

***Spinus xanthogastrus* (Du Bus de Gisignies, 1855), Yellow-bellied Siskin**
Figure 11P, Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 5 (Supplemental Table S155); stations: 1

and 28, and trail: PR; 8.IV.2016 to 25.VI.2018; type: PC, WS, and PH; voucher: PH.

Identification. The male has a black head to upper breast, black wings with a yellow patch, and yellow underparts (Fig. 11P). The female is more uniformly olive-yellow, but still with a prominent yellow wing-patch (Fig. 11Q).

Passerellidae

***Chlorospingus pileatus* (Salvin, 1865), Sooty-capped Chlorospingus**

Figure 11R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 25 (Supplemental Table S156); stations: 7, 9, 12, 16, and 32, and trails: CH, GA, JI, LQ, MO, PR, RI, and SE; 3.VIII.2016 to 24.III.2019; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Similar to Common Chlorospingus (Fig. 12A), but with a broad, jagged supercilium instead of a white postocular triangle.

***Chlorospingus flavopectus* (Lafresnaye, 1840), Common Chlorospingus**

Figure 12A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4410 (Supplemental Table S157); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CH, DV, GA, HC, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 15.III.2016 to 29.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Olive-yellow and gray with a distinctive white postocular triangle.

***Arremon brunneinucha* (Lafresnaye, 1839), Chestnut-capped Brushfinch**

Figure 12B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 580 (Supplemental Table S158); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, WS, and WF; 8.IV.2016 to 15.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Dark olive with a black face, white preocular spot, chestnut crown, and puffy white throat.

***Arremon crassirostris* (Cassin, 1865), Sooty-faced Finch**

Figure 12C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S159); trail: RI; 10.VI.2019; type: WS; voucher: PH; endemic: Eh-c. Occurs at Tacarcuna in eastern Panamá and northwestern Colombia (Rising and Jaramillo 2020; Garrigues and Dean 2014).

Identification. Dark with a rusty crown, white submoustachial stripe, and yellow belly.

***Zonotrichia capensis* (Müller, 1776), Rufous-collared Sparrow**

Figure 12D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 82 (Supplemental Table S160); stations: 16, 17, 19, 24, 26, and 33, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WF; 18.VIII.2016 to 27.I.2020; type: PC, WS, and PH; voucher: PH.

***Atlapetes albinucha* (Lafresnaye & d'Orbigny, 1838), White-naped Brushfinch**

Figure 12E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 145 (Supplemental Table S161); stations: 1, 7, 14, 15, 16, 17, 18, 20, 26, 28, 32, and E10, and trails: AM, BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, VR, and WS; 24.III.2016 to 11.V.2020; type: PC, WS, and CT; voucher: PH.

Identification. Gray with a black head, white central crown-stripe, and yellow throat.

***Atlapetes tibialis* (Lawrence, 1864), Yellow-thighed Brushfinch**

Figure 12F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 640 (Supplemental Table S162); stations: 1, 3, 5, 7, 9, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 38, 39, and E10, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 14.III.2016 to 26.V.2020; type: PC, WS, CT, and PH; voucher: PH; endemic: Eh-wp.

Identification. Gray to black with yellow thigh feathering.

Icteridae

***Psarocolius wagleri* (Gray, 1845), Chestnut-headed Oropendola**

Figure 12G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S163); trail: PR; 24.V.2019 to 14.II.2021; type: WS and PH; voucher: PH. A pair nest in a field about 1 km down the road from the reserve and are occasionally seen in the lower parts of the reserve.

Identification. Gray and greenish bill, blue iris, dark brown head and rump, black upperparts and wings, black and yellow tail.

***Icterus galbula* (Linnaeus, 1758), Baltimore Oriole**

Figure 12H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2 (Supplemental Table S164); trails: JI and PR; 14.XI.2017 to 10.I.2018; type: WS; voucher: PH.

Identification. The male is black and orange with black and white wings and a pale conical bill (Fig. 12H). The female is variably brown to yellow, with an orange breast and double white wing-bar.

Figure 12. Birds of Cloudbridge. **A.** *Chlorospingus flavopectus*. **B.** *Arremon brunneinucha*. **C.** *Arremon crassirostris*. **D.** *Zonotrichia capensis*. **E.** *Atlapetes albinucha*. **F.** *Atlapetes tibialis*. **G.** *Psarocolius wagleri*. **H.** *Icterus galbula*, male. **I.** *Molothrus aeneus*. **J.** *Dives dives*. **K.** *Seiurus aurocapilla*. **L.** *Parkesia motacilla*. **M.** *Vermivora chrysoptera*, male. **N.** *Mniotilta varia*, male. **O.** *M. varia*, female. **P.** *Oreothlypis gutturalis*. **Q-R.** *Leiothlypis peregrina*. Photos by: R. Andrews (C, F, P), J. Slifkin (A, B, D, E, I, K, M), M. Smokoska (J, L, R), F. Spooner (N, O, Q), L. Valverde (G), and W. Van Doorninck (H).

***Molothrus aeneus* (Wagler, 1829), Bronzed Cowbird**
Figure 12I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S165); trails: JI and PR; 25.VII.2017 to 27.V.2019; type: WS and PH; voucher: PH.

***Dives dives* (Deppe, 1830), Melodious Blackbird**
Figure 12J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 7 (Supplemental Table S166); station: 37, and trails: HE and PR; 18.I.2015 to 21.VI.2019; type: PC, WS, and PH; voucher: PH.

Parulidae

***Seiurus aurocapilla* (Linnaeus, 1766), Ovenbird**
Figure 12K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 5 (Supplemental Table S167); station: E11, and trail: JI; 13.IV.2019 to 21.IV.2020; type: CT and PH; voucher: PH.

***Parkesia motacilla* (Vieillot, 1809), Louisiana Waterthrush**
Figure 12L

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 9 (Supplemental Table S168); stations: 32 and R4, and trails: MG, PR, RI, and SE; 15.III.2017 to 20.II.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. A thrush-like warbler, brown above with a pale supercilium and brown-spotted underparts. Best distinguished from the Northern Waterthrush (*Parkesia noveboracensis*) by its broader, bicolored supercilium (buffy before the eye and white behind) and buff-washed flanks and undertail coverts.

***Vermivora chrysoptera* (Linnaeus, 1766), Golden-winged Warbler (NT)**
Figure 12M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 241 (Supplemental Table S169); stations: 1, 3, 5, 7, 9, 14, 15, 16, 17, 18, 19, 20, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, and 37, and trails: BA, CH, DV, GA, HE, JI, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 14.III.2016 to 18.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is gray and white with a yellow forecrown, strong black and white facial stripes, black throat, and yellow shoulder patch (Fig. 12M). The female is duller, with paler gray facial markings.

***Mniotilta varia* (Linnaeus, 1766), Black-and-white Warbler**
Figure 12N, O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 472 (Supplemental Table S170); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, and 38, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, and WF; 17.III.2016 to 23.III.2020; type: PC, WS, and PH; voucher: PH.

***Oreothlypis gutturalis* (Cabanis, 1861), Flame-throated Warbler**
Figure 12P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 169 (Supplemental Table S171); stations: 3, 5, 7, 9, 12, 14, 15, 16, 18, 20, 26, 27, 28, 31, 33, 36, 38, and 39, and trails: BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, and SE; 28.III.2016 to 28.IV.2020; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. Dark gray with a distinctive orange throat to breast.

***Leiothlypis peregrina* (Wilson, 1811), Tennessee Warbler**
Figure 12Q, R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 844 (Supplemental Table S172); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38 and 39, and trails: CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 14.III.2016 to 10.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male in breeding plumage is olive-green above and whitish below with a gray crown and nape, dark eyeline, white supercilium, and white vent. Figure 12Q likely shows a male in (or close to) breeding plumage. Most birds at Cloudbridge are seen in non-breeding or transitional plumages, in which both sexes are duller overall and yellower underneath (Fig. 12R).

***Setophaga pitiayumi* (Vieillot, 1817), Tropical Parula**
Figure 13A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 230 (Supplemental Table S173); stations: 1, 3, 5, 7, 9, 14, 15, 16, 17, 18, 19, 20, 24, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, 38, and 39, and trails: AM, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, WS, and WF; 15.III.2016 to 20.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Blue above with black lores, yellow below with an orange wash to the breast.

***Setophaga fusca* (Müller, 1776), Blackburnian Warbler**
Figure 13B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 212 (Supplemental Table S174); stations: 1, 3, 5, 7, 12, 14, 15, 16, 17, 18, 19, 20, 22, 25, 27, 28, 30, 31, 32, 33, and 36, and trails: BA, DV, GA, HE, JI, LQ, MG, MO, PR, RI, VR, and WS; 14.III.2016 to 17.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. Black and white with a yellow-orange face and throat. The individual shown in Figure 13B is

Figure 13. Birds of Cloudbridge. **A.** *Setophaga pitiayumi*. **B.** *Setophaga fusca*, male. **C.** *Setophaga virens*, male. **D.** *Basileuterus melanogenys*. **E.** *Basileuterus culicivorus*. **F.** *Basileuterus melanotis*. **G.** *Myiothlypis fulvicauda*. **H.** *Cardellina canadensis*, male. **I.** *Cardellina pusilla*, male. **J.** *Myioborus miniatus*. **K.** *Myioborus torquatus*. **L.** *Piranga rubra*, male. **M.** *Piranga rubra*, female. **N.** *Piranga bidentata*, male. **O.** *Piranga leucoptera*, male. **P.** *Pheucticus tibialis*. **Q.** *Pheucticus ludovicianus*, adult male. **R.** *P. ludovicianus*, immature male. Photos by: L. Allnatt (B, L), R. Andrews (E, F), J. Slifkin (A, D, G, H, I, J, K, N, O, Q), M. Smokoska (M, P, R), and F. Spooner (C).

likely a male in breeding plumage, as females and non-breeding males are typically duller in coloration.

***Setophaga virens* (Gmelin, 1789), Black-throated Green Warbler**

Figure 13C

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 301 (Supplemental Table S175); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 24, 27, 28, 30, 31, 32, 33, 34, 36, and 37, and trails: BA, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, and WF; 17.III.2016 to 20.III.2020; type: PC, WS, and PH; voucher: PH.

***Basileuterus melanogenys* (Baird, 1865), Black-cheeked Warbler**

Figure 13D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 194 (Supplemental Table S176); stations: 3, 5, 7, 9, 14, 15, 16, 20, 26, 32, and 34, and trails: CH, DV, GA, HE, JI, MG, MO, PR, RI, and SE; 21.III.2016 to 12.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Black face, white supercilium, rufous crown-stripe.

***Basileuterus culicivorus* (Deppe, 1830), Golden-crowned Warbler**

Figure 13E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 692 (Supplemental Table S177); stations:1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 25, 26, 27, 28, 30, 31, 33, 34, 35, 36, 37, 38, 39, E8, and W1, and trails: BA, CH, DV, GA, HC, HE, JI, MO, PR, RI, SE, VR, WS, and WF; 1.IV.2016 to 14.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. Black and yellow facial stripes, yellow-orange crown-stripe, yellow underparts.

***Basileuterus melanotis* (Lawrence, 1868), Costa Rican Warbler**

Figure 13F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 474 (Supplemental Table S178); stations: 1, 5, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, and I1, and trails: BA, CV, DV, GA, HE, JI, MG, MO, PR, RI, SE, VR, and WS; 14.III.2016 to 7.V.2020; type: PC, WS, CT, and PH; voucher: PH; endemic: Eh-wp.

Identification. Black and whitish facial striping, pale yellow underparts. Paler with a different facial pattern from the similar Golden-crowned Warbler (*Basileuterus culicivorus*) (Fig. 13E). Although currently considered an endemic species, it is sometimes included within Three-striped Warbler (*Basileuterus tristriatus*), which is not endemic to the region.

***Myiothlypis fulvicauda* (Spix, 1825), Buff-rumped Warbler**

Figure 13G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 33 (Supplemental Table S179); stations: 18, 31, 32, 35, 36, 39, and R4, and trails: BA, PR, RI, SE, and WF; 9.X.2017 to 14.X.2019; type: PC, WS, CT, and PH; voucher: PH.

Identification. Drab with a pale supercilium and bright buff lower rump and basal tail half.

***Cardellina canadensis* (Linnaeus, 1766), Canada Warbler**

Figure 13H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 4 (Supplemental Table S180); stations: 3 and 27, and trails: JI and PR; 19.IV.2019 to 28.IV.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is gray and yellow with a white eye-ring, yellow supraloral line, and distinctive necklace of dark streaks (Fig. 13H). The female is duller, with a fainter necklace.

***Cardellina pusilla* (Wilson, 1811), Wilson's Warbler**

Figure 13I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 926 (Supplemental Table S181); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: BA, CG, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 14.III.2016 to 12.V.2020; type: PC, WS, and PH; voucher: PH.

***Myioborus miniatus* (Swainson, 1827), Slate-throated Redstart**

Figure 13J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 3159 (Supplemental Table S182); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, E7, E8, G4, M7, M8, and M9, and trails: AM, BA, CG, CV, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 14.III.2016 to 29.V.2020; type: PC, WS, CT, and PH; voucher: PH.

Identification. Dark blue-gray with yellow underparts and a rufous crown patch.

***Myioborus torquatus* (Baird, 1865), Collared Redstart**

Figure 13K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 88 (Supplemental Table S183); stations: 7, 9, 12, 17, 20, 28, and 31, and trails: BA, CH, DV, GA, MO, JI, PR, RI, and SE; 28.III.2016 to 28.IV.2020; type: PC and WS; voucher: PH; endemic: Eh-wp.

Identification. Yellow face and underparts, rufous crown patch, blue-gray breastband and upperparts.

Cardinalidae

***Piranga rubra* (Linnaeus, 1758), Summer Tanager**
Figure 13L, M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 107 (Supplemental Table S184); stations: 1, 3, 5, 12, 14, 15, 16, 17, 19, 20, 25, 27, 28, 31, 33, 34, 35, 36, and 39, and trails: BA, DV, GA, HE, JI, MG, MO, PR, RI, SE, WF, and WC; 9.I.2015 to 16.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is bright red (Fig. 13L), the female yellow (Fig. 13M), both with a pale yellowish bill.

***Piranga bidentata* (Swainson, 1827), Flame-colored Tanager**
Figure 13N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 387 (Supplemental Table S185); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 20, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, and 38, and trails: AM, CV, CH, DV, GA, HE, JI, LQ, MO, PR, RI, SE, VR, and WS; 17.III.2016 to 15.V.2020; type: PC and WS; voucher: PH.

Identification. The male is red-orange (Fig. 13N), the female olive-yellow, both with a dusky ear-patch, streaky mantle, and brown-black wings with a double wing-bar.

***Piranga leucoptera* (Trudeau, 1840), White-winged Tanager**
Figure 13O

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 149 (Supplemental Table S186); stations: 1, 3, 5, 9, 12, 14, 15, 16, 17, 20, 27, 28, 31, 33, 35, 36, and 38, and trails: AM, CH, DV, GA, HE, JI, MO, PR, RI, and WS; 15.III.2016 to 11.V.2020; type: PC and WS; voucher: PH.

Identification. The male is red with a black mask and black wings (Fig. 13O), the female dull olive with yellower underparts, both with a thick, bicolored bill and double white wing-bar.

***Pheucticus tibialis* (Lawrence, 1867), Black-thighed Grosbeak**
Figure 13P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 27 (Supplemental Table S187); stations: 9, 19, 20, 28, 32, and 33, and trails: CH, DV, GA, HE, JI, LQ, PR, RI, and SE; 9.I.2015 to 20.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Yellow with a thick bill, brown-black wings, and white wingspot.

***Pheucticus ludovicianus* (Linnaeus, 1766), Rose-breasted Grosbeak**
Figure 13Q, R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 8 (Supplemental Table S188); stations: 3, 5, 17, 31, and 35, and trails: BA, DV, HE, and PR; 18.I.2015 to 27.III.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is black and white with a thick pale bill and rosy breast-patch (Fig. 13Q). The bird shown in Figure 13R appears to be molting into adult male plumage. The female is streaky and brown with a white brow.

***Amaurospiza concolor* (Cabanis, 1861), Blue Seedeater**
Figure 14A, B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 34 (Supplemental Table S189); stations: 5, 19, 20, 24, 31, 33, 35, and 36, and trails: BA, DV, HE, JI, MO, PR, RI, and VR; 24.III.2016 to 22.V.2020; type: PC and WS; voucher: PH.

Identification. The male is dull dark blue (Fig. 14A), the female tawny-brown (Fig. 14B), both with a rounded gray bill. Found in bamboo-dominated areas in or at the edges of middle-elevation and highland forest.

Thraupidae

***Ramphocelus passerinii* (Bonaparte, 1831), Scarlet-rumped Tanager**
Figure 14C, D

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 153 (Supplemental Table S190); stations: 27, 31, and 35, and trails: AM, BA, CG, CH, DV, GA, HE, JI, MG, MO, PR, RI, SE, VR, WS, and WF; 25.III.2016 to 7.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male is black with a bright red lower back to rump and uppertail coverts (Fig. 14C); the female is gray-brown with a yellowish mantle and underparts and orange breast and rump (Fig. 14D); both sexes have a pale blue-gray bill with a black tip. The subspecies *costaricensis*, which is endemic to the Pacific slope of Costa Rica and western Panamá, and is sometimes considered to be a separate species, "Cherrie's Tanager", which is distinguishable from the nominate subspecies by the orange breast and rump of the female.

***Thraupis episcopus* (Linnaeus, 1766), Blue-gray Tanager**
Figure 14E

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 10 (Supplemental Table S191); stations: 16, 28, and 35, and trails: BA and PR; 8.XI.2016 to 15.VII.2019; type: PC, WS, and PH; voucher: PH.

***Thraupis palmarum* (Wied, 1821), Palm Tanager**
Figure 14F

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 18 (Supplemental Table S192); stations: 17, 20, and 30, and trails: BA, HE, PR, and WS; 8.IV.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Figure 14. Birds of Cloudbridge. **A.** *Amaurospiza concolor*, male. **B.** *A. concolor*, female. **C.** *Ramphocelus passerinii*, male. **D.** *R. passerinii*, female. **E.** *Thraupis episcopus*. **F.** *Thraupis palmarum*. **G.** *Ixothraupis guttata*. **H.** *Stilpnia larvata*. **I.** *Tangara dowii*. **J.** *Tangara gyrola*. **K.** *Tangara icterocephala*. **L.** *Dacnis venusta*, male. **M.** *D. venusta*, female. **N.** *Cyanerpes cyaneus*, male. **O.** *Diglossa plumbea*, male. **P.** *D. plumbea,* female. **Q.** *Sporophila corvina*, male. **R.** *Coereba flaveola*. Photos by: L. Allnatt (C, M), R. Andrews (A, I, O, R), J. Slifkin (B, D, E, F, G, P, Q), and F. Spooner (H, J, K, L, N).

***Ixothraupis guttata* (Cabanis, 1850), Speckled Tanager**

Figure 14G

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 229 (Supplemental Table S193); stations: 1, 5, 15, 16, 17, 18, 19, 20, 25, 27, 28, 30, 31, 32, 35, 37, and 38, and trails: AM, BA, CH, GA, HE, JI, LQ, MO, PR, RI, SE, WS, and WF; 15.III.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Yellow-green and blue with black lores and extensive black spangling.

***Stilpnia larvata* (Du Bus de Gisignies, 1846), Golden-hooded Tanager**

Figure 14H

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 31 (Supplemental Table S194); stations: 5, 9, 17, 28, 31, and 35, and trails: BA, JI, LQ, PR, and RI; 21.V.2015 to 5.II.2020; type: PC, WS, and PH; voucher: PH.

Identification. Pale golden hood, blue-black mask, back, and breast, white belly.

***Tangara dowii* (Salvin, 1863), Spangle-cheeked Tanager**

Figure 14I

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 97 (Supplemental Table S195); stations: 5, 7, and 9, and trails: CH, GA, JI, LQ, MO, and PR; 12.IX.2016 to 19.V.2020; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Black and rufous-orange with greenish spangling on its cheeks and hindneck.

***Tangara gyrola* (Linnaeus, 1758), Bay-headed Tanager**

Figure 14J

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 99 (Supplemental Table S196); stations: 15, 16, 17, 18, 28, 30, 31, 35, 37, and 38, and trails: BA, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 14.IV.2016 to 26.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Green above, blue below, with a rufous-brown head and thin yellow nape band.

***Tangara icterocephala* (Bonaparte, 1851), Silver-throated Tanager**

Figure 14K

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 2070 (Supplemental Table S197); stations: 1, 3, 5, 7, 9, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39, and trails: AM, BA, CG, CB, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, and WF; 18.III.2016 to 29.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Yellow with a streaked back, black moustachial stripe, and silvery-gray throat.

***Dacnis venusta* (Lawrence, 1862), Scarlet-thighed Dacnis**

Figure 14L, M

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 259 (Supplemental Table S198); stations: 1, 14, 15, 16, 17, 18, 19, 20, 26, 27, 28, 30, 31, 33, and 35, and trails: AM, BA, CH, DV, GA, HE, JI, LQ, MG, MO, PR, RI, SE, VR, WS, WF, and WC; 18.III.2016 to 22.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. The male has a bright blue head and upperparts, black mask, wings, and underparts, and scarlet thighs (Fig. 14L). The female has a blue face and shoulder and pale buffy underparts (Fig. 14M).

***Cyanerpes cyaneus* (Linnaeus, 1766), Red-legged Honeycreeper**

Figure 14N

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 1 (Supplemental Table S199); trail: PR; 30.I.2016; type: PH; voucher: PH.

Identification. Decurved bill, bright red legs and feet. The male, in breeding plumage, is purplish-blue and black with a pale blue crown and black mask (Fig. 14N). The female is pale green; the non-breeding male is similar but with black wings and tail.

***Diglossa plumbea* (Cabanis, 1861), Slaty Flowerpiercer**

Figure 14O, P

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 37 (Supplemental Table S200); stations: 3, 16, 18, 28, 30, and 37, and trails: CH, DV, GA, HE, JI, LQ, MO, PR, RI, and VR; 25.IV.2016 to 24.XII.2019; type: PC, WS, and PH; voucher: PH; endemic: Eh-wp.

Identification. Distinctive upturned, hook-tipped bill. The male is dark bluish-gray (Fig. 14O), the female paler olive (Fig. 14P).

***Sporophila corvina* (Sclater, 1860), Variable Seedeater**

Figure 14Q

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 6 (Supplemental Table S201); trails: BA, LQ, PR, and WS; 7.VIII.2017 to 15.V.2020; type: WS and PH; voucher: PH.

Identification. The male of subspecies *hoffmanni*, present on the Pacific slope of Costa Rica, is black and white with a black bill, black throat, white neck-collar, black breastband, and white wing-patch (Fig. 14Q). The female is olive-brown with a black bill.

***Coereba flaveola* (Linnaeus, 1758), Bananaquit**

Figure 14R

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 8 (Supplemental Table S202); station: 32, and trails: BA, CB, CH, GA, PR, SE, and WF; 16.XI.2016 to 31.V.2019; type: PC and WS; voucher: PH.

***Tiaris olivaceus* (Linnaeus, 1766), Yellow-faced Grassquit**

Figure 15A

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 57 (Supplemental Table S203); stations: 3, 16, 18, 27, and 35, and trails: AM, BA, CH, DV, GA, HE, JI, MG, MO, PR, SE, and WS; 24.III.2016 to 26.II.2020; type: PC, WS, and PH; voucher: PH.

***Saltator maximus* (Müller, 1776), Buff-throated Saltator**

Figure 15B

New records. COSTA RICA – **San José** • Cloudbridge Nature Reserve; 130 (Supplemental Table S204); stations: 1, 3, 15, 16, 17, 18, 20, 27, 28, 30, 31, 35, and 36, and trails: AM, CG, CH, DV, GA, HE, JI, MG, MO, PR, RI, SE, and WS; 8.IV.2016 to 29.V.2020; type: PC, WS, and PH; voucher: PH.

Identification. Gray face, white brow, thick dark bill, olive-green upperparts, bicolored throat (gray above and buffy below) with a broad black border.

Discussion

In this paper, the results of point count, walking survey, call-playback, and camera trapping surveys have been combined with photographic evidence to compile a bird inventory of Cloudbridge Nature Reserve in the Talamanca Mountains of Costa Rica. The TMCFs of Central America are known for their high concentration of endemic species (Hernández-Baños et al. 1995; Jankowski and Rabenold 2007) which holds true at Cloudbridge as, of the 204 bird species documented in the reserve, 20% are endemics. Previous research in Central American TMCFs has revealed an overall richness gradient with respect to endemic bird species travelling from north to south, the Talamanca Mountains containing about twice as many endemics as the areas furthest north in Mexico (Hernández-Baños et al. 1995). The Cloudbridge results are consistent with this as bird studies in TMCFs north of the reserve had lower percentages of endemics than Cloudbridge, such as in the Sierra Madre del Sur mountains of Mexico (16%) (Almazán-Núñez et al. 2018), the Alta Verapez area of Guatemala (13%) (Eisermann and Schulz 2005), the Montecristo National Park in El Salvador (12%) (Komar 2002), and even the Monteverde region in the Tilarán mountains in the northern half of Costa Rica (17%) (Fogden 2014).

Within the Talamanca Mountains, there is limited published information on bird inventories within TMCF habitat, and what does exist is restricted to the northern end of the range and is limited in scope. Only a single detailed inventory was found, from a bird blitz conducted on 20 March 2016 in the Parque Nacional Tapantí and Reserva Forestal Río Macho (Arias-Quirós and Carmen 2017), a 60,000 ha area northwest of Cloudbridge (APPN 2020; SINAC 2020). The blitz recorded 247 species, 22% of which were endemics; however, these results are not directly comparable to Cloudbridge or the other TMCF studies as they include data collected at lower elevations outside the TMCF as well as high elevation páramo habitat. As such, the percentage of endemic species in only the TMCF is likely lower than 22%. Notably, the Tapantí and Río Macho study recorded 45 of the 50 species listed by Garrigues et al. (2020a) as endemic to the highlands of Costa Rica and western Panamá (hereafter referred to as "highland endemics").

This high concentration of highland endemics within one area has also been found in at least two other areas in the northern Talamanca Mountains—San Gerardo de Dota and Cloudbridge—which suggests that it may be common for a high percentage of highland endemics to be present in, or utilize, any given area within this region. The Tapantí and Río Macho study recorded 90% of Costa Rica's highland endemics, even though the survey occurred over only a single day (Arias-Quirós and Carmen 2017). Oostra et al. (2008) studied endemic species in the TMCF of the San Gerardo de Dota area (26 km northwest of Cloudbridge) and identified 70% of the 50 Costa Rican highland endemics in a 12,500 ha area in a single dry-season (December 2003–April 2004). Finally, Cloudbridge, a relatively small reserve of 255 ha, recorded 37% of the total number of endemic species in Costa Rica, and 72% of the highland endemics. A lack of published inventories from TMCF areas further south in the Talamanca Mountains makes it unclear if the high highland endemic richness seen in the north holds true for the entire Talamanca range.

Although high endemic species richness has been recorded in the reserve, overall presence of most of those species is generally low. While 88% of the endemics have been detected in the reserve each year since their

Figure 15. Birds of Cloudbridge. **A.** *Tiaris olivaceus*, male. **B.** *Saltator maximus*. Photos by: A. Greene (A) and J. Slifkin (B).

first identification, most have uncommon or rare presence in any given month, and 63% are not detected at all in at least one month of the year (Supplemental Table S207). A similar patchiness of highland endemics was reported by Jankowski and Rabenold (2007) who found that highland endemics were often sparsely distributed in the Monteverde Cloud Forest Reserve in the Tilarán mountains.

Although both studies found patchy endemic species presence, Jankowski and Rabenold's (2007) results show a patchy spatial distribution, while the Cloudbridge results show that patchiness often to be temporally distributed. The presence of many of the endemics in the reserve varied widely over time, with the monthly presence of a given species pooled over all survey years often changing by up to three categories over the course of the year (Supplemental Table S207). When examining the presence data between years, the months of highest and lowest presence for individual endemics often varied, and while some had relatively predictable presence patterns between years, others had no discernable monthly presence patterns from year-to-year. For example, White-throated Mountain-gem, one of the more common endemics in the reserve, in February ranged from common in 2018 and 2019, to fairly common in 2020, to absent in 2017.

Recognizing this temporal variability is important because many bird studies in Costa Rica are conducted over a limited number of months (e.g. Jankowski and Rabenold 2007; Fink et al. 2009; Gasner et al. 2010), with many focusing solely on the dry season (e.g. Blake and Loiselle 2000; Oostra et al. 2008; Şekercioğlu et al. 2019), which could result in a large amount of diversity in an area being missed. For example, Jankowski and Rabenold's (2007) study was conducted between May and June 2001; if the Cloudbridge bird studies had been limited to May and June, 35 species would have been missed, including four endemic species and two Near Threatened species. Limiting the Cloudbridge results to just the dry season (December–March) resulted in a smaller drop, but still missed 18 species including one endemic.

Just as year-round data provides a more complete picture of species' presence, using multiple survey techniques is also important, in particular for identifying rare or elusive birds. Not including photographic evidence, 22 species were identified only by a single survey technique—by point counts (2), walking surveys (17), or camera traps (3)—and 11 species were solely recorded due to photographs. Walking surveys were particularly important for recording soaring birds, swifts, and swallows as the dense canopy at most survey locations made it difficult to get a clear view of the open sky. Martin et al. (2010) studied the effectiveness of mist netting and point counts in TMCF habitat and found, even when used together, that both methods still failed to detect 27.8% of species and concluded that inventories need to incorporate a wide range of sampling methods to be effective.

Although not a traditional technique, camera trapping is increasingly being used to study birds, in particular terrestrial or particularly secretive birds (O'Brien and Kinnaird 2008; Roncal et al. 2019). Although camera trap data was used in this report only for supplemental purposes, it provided valuable data on the presence of several terrestrial species not picked up by our point count and walking surveys and captured the only non-incidental records of Ovenbird (*Seiurus aurocapilla*), and our only records for Ruddy Quail-Dove and Gray-cowled Wood-Rail. During surveys, two species—Highland Tinamou (*Nothocercus bonapartei*) and Buff-fronted Quail-Dove (*Zentrygon costaricensis*)—were recorded only one and three times, respectively, but the camera traps showed they were regularly present throughout much of the year (Supplemental Table S207). Black-billed Nightingale-Thrush (*Catharus gracilirostris*) had patchy monthly survey detections but was confirmed by camera trap data to be present almost year-round.

Several studies in the Neotropics have found camera traps effective at surveying quail-doves, tinamous, thrushes, guans, and a variety of other terrestrial birds (Roncal et al. 2019, Santos-Moreno et al. 2019; Sáenz-Bolaños et al. 2020). Thornton et al. (2012) compared camera trapping with audiovisual surveys specifically for Highland Tinamou and found camera trapping to be much more effective as it allowed for data collection during the nocturnal and crepuscular periods when the species is active. Fontúrbel et al. (2020) compared point counts and camera trapping for general bird surveys and found that while point counts recorded more species overall, camera trapping provided additional value in that it was less biased towards large-bodied or conspicuous species and picked up species active outside of standard survey periods, and that therefore survey results were better when both methods were used simultaneously.

Despite its small size and mostly secondary forest condition, the overall high avian diversity and, in particular, the high endemic species richness in Cloudbridge are similar to other TMCF areas in the northern part of the Talamanca mountains. This inventory also highlights the value of year-round, multi-year data collection, and the importance of using a variety of survey methods to capture a more complete picture of an area's avian diversity. While a challenge due to access, facilities, weather, and funding, year-round studies in more locations throughout the TMCFs of the Talamanca Mountains would be valuable for our understanding of the rich and unique bird community of this remarkable area.

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Authors' Contributions

Conceptualization: JR, FTS, JRP. Data curation: JR, JRP. Formal analysis: JRP. Investigation: FTS, JRP, JR, RA, JPS, LA. Methodology: JR, FTS, JRP. Project administration: FTS, JRP, JR. Supervision: JRP, FTS, JR. Validation: LA, JR, FTS, JPS, RA, MS, JRP. Visualization: RA, FTS, MS, JPS, LA, JR, JRP. Writing – original draft: JPS, JRP. Writing – review and editing: JRP, JPS.

References

Almazán-Núñez RC, Alvarez-Alvarez EA, Ruiz-Gutiérrez F, Almazán-Juárez A, Sierra-Morales P, Toribio-Jiménez S (2018) Biological survey of a cloud forest in southwestern Mexico: plants, amphibians, reptiles, birds, and mammals. Biota Neotropica 18 (2): e20170444. https://doi.org/10.1590/1676-0611-BN-2017-0444

Áreas Protegidas y Parques Nacionales de Costa Rica (APPN) (2020) Reserva Forestal Río Macho. https://areasyparques.com/areasprotegidas/rio-macho/. Accessed on: 2020-10-05.

Arias-Quirós M, Carmen EM (2017) Resultados del primer conteo de aves Tapantí-Río Macho, Costa Rica. Zeledonia 21 (1): 24–38.

Athanas N (2005) XC9479 Costa Rican Pygmy Owl *Glaucidium costaricanum*. www.xeno-canto.org/9479.

AYA (Instituto Costarricense de Acueductos y Alcantarillos) (2019) 310102 San Gerardo Meteorológica [data file]. AYA – UEN Gestión Ambiental Área Funcional de Estudios Básicos, San José, Costa Rica.

Berry R, Wood CL, Sullivan BL (2009) Orange-breasted Falcon (*Falco deiroleucus*), version 1.0. In: Schulenberg TS (Ed.) Neotropical birds online. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/nb.orbfal1.01. Accessed between: 2019-06-01 and 2020-09-15.

Billerman SM, Keeney BK, Rodewald PG, Schulenberg TS (Eds.) (2020) Birds of the world. Cornell Laboratory of Ornithology, Ithaca, NY, USA. https://birdsoftheworld.org/bow/home. Accessed between: 2019-06-01 and 2020-09-15.

BirdLife International (2019) EBA summary. http://datazone.birdlife.org/eba Accessed on: 2019-10-09.

BirdLife International (2020) Endemic bird areas factsheet: Costa Rica and Panamá highlands. http://datazone.birdlife.org/eba/factsheet/18. Accessed on: 2020-09-15.

Blake JG, Loiselle BA (2000) Diversity of birds along an elevational gradient in the Cordillera Central, Costa Rica. The Auk 117 (3): 663–686. https://doi.org/10.1642/0004-8038(2000)117[0663:DOBAAE]2.0.CO;2

Blasiak R (2011) Ethics and environmentalism: Costa Rica's lesson. United Nations University. https://unu.edu/publications/articles/ethics-and-environmentalism-costa-ricas-lesson.html.

Boesman P (2010) XC274426 Mottled Owl *Strix virgata*. Accessible at www.xeno-canto.org/274426

Bubb P, May I, Miles L, Sayer J (2004) Cloud Forest Agenda. UNEP-WCMC, Cambridge, UK. https://ia800302.us.archive.org/23/items/cloudforestagend04bubb/cloudforestagend04bubb.pdf.

Braga ACR, Motta-Junior JC (2009) Weather conditions and moon phase influence on Tropical Screech Owl and Burrowing Owl detection by playback. In: Johnson DH, Van Nieuwenhuyse D, Duncan JR (Eds.) Proceedings of the Fourth World Owl Conference Oct–Nov 2007, Groningen, The Netherlands. Ardea 97(4): 395–401. https://doi.org/10.5253/078.097.0401

Chaves J (2015) XC276794 Tropical Screech Owl *Megascops choliba luctisonus*. www.xeno-canto.org/276794.

Clements JF, Schulenberg TS, Iliff MJ, Billerman SM, Fredericks TA, Sullivan BL, Wood CL (2019) The eBird/Clements checklist of birds of the world: v2019. http://www.birds.cornell.edu/clementschecklist/download.

Cornell Lab of Ornithology (2019) All about birds. Cornell Lab of Ornithology, Ithaca, USA. https://www.allaboutbirds.org/. Accessed between: 2019-06-01 and 2020-09-15.

Eisermann K, Schulz U (2005) Birds of a high-altitude cloud forest in Alta Verapez, Guatemala. Revista de Biología Tropical 53 (3–4): 577–594.

Fink RD, Lindell CA, Morrison EB, Zahawi RA, Holl KD (2009) Patch size and tree species influence the number and duration of bird visits in forest restoration plots in southern Costa Rica. Restoration Ecology 17 (4): 479–486. https://doi.org/10.1111/j.1526-100X.2008.00383.x

Fogden MP (2014) Apéndice 9: Aves de la zona de Monteverde. In: Wheelwright NT, Nadkarni NM (Eds.) Monteverde: ecología y conservación de un bosque nuboso tropical. Bowdoin's Scholars' Bookshelf. Book 3. Oxford University Press, New York, USA, 865 pp.

Fontúrbel FE, Rodríguez-Gómez GB, Fernández N, García B, Orellana JI, Castaño-Villa GJ (2020) Sampling understory birds in different habitat types using point counts and camera traps. Ecological Indicators 119: 106863. https://doi.org/10.1016/j.ecolind.2020.106863

Garrigues R, Camacho-Varela P, Montoya M, O'Donnell P, Zook J (2020a) Lista Oficial de Aves Endémicas para Costa Rica y la Región. Comité de Especies Raras y Registros Ornitológicos de Costa Rica (Comité Científico), Asociación Ornitológica de Costa Rica. Zeledonia 22: 2. San José, Costa Rica. https://listaoficialavesdecostarica.wordpress.com/lista-oficial/aves-endemicas-de-costa-rica/.

Garrigues R, Camacho-Varela P, Montoya M, O'Donnell P, Zook J (2020b) Lista Oficial de Las Aves de Costa Rica 2019–2020. Comité de Especies Raras y Registros Ornitológicos de Costa Rica (Comité Científico), Asociación Ornitológica de Costa Rica. San José, Costa Rica. https://listaoficialavesdecostarica.wordpress.com/lista-oficial/.

Garrigues R, Dean R (2014) The birds of Costa Rica: a field guide. Zona Tropical, Ithaca, USA, 387 pp.

Gasner MR, Jankowski JE, Ciecka AL, Kyle KO, Rabenold KN (2010) Projecting the local impacts of climate change on a Central American montane avian community. Biological Conservation 143: 1250–1258. https://doi.org/10.1016/j.biocon.2010.02.034

Harris JBC, Haskell DG (2013) Simulated birdwatchers' playback affects the behavior of two tropical birds. PLoS ONE 8 (10): e77902. https://doi.org/10.1371/journal.pone.0077902

Hernández-Baños BE, Townsend Peterson A, Navarro-Sigüenza AG, Escalante-Pliego BP (1995) Bird faunas of the humid montane forests of Mesoamerica: biogeographic patterns and priorities for conservation. Bird Conservation International 5: 251–277. https://doi.org/10.1017/S0959270900001039

Holdridge LR (1967) Life zone ecology, revised edition. Tropical Science Center, San Jose, Costa Rica, 149 pp.

del Hoyo J, Collar N, Kirwan GM, Boesman PFD (2020) Garden Emerald (*Chlorostilbon assimilis*), version 1.0. In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Birds of the world. Cornell Lab of Ornithology, Ithaca, USA. https://doi.org/10.2173/bow.gareme1.01. Accessed between: 2019-06-01 and 2020-09-15.

del Hoyo J, Elliott A, Sargatal J, Christie DA, Kirwan G (eds.) (2019) Handbook of the birds of the world alive. Lynx Edicions, Barcelona, Spain. http://www.hbw.com/. Accessed between: 2019-06-01 and 2019-09-13.

IUCN (2020) The IUCN Red List of threatened species. Version 2020-2. http://www.iucnredlist.org. Accessed on: 2020-09-15.

Jankowski JE, Rabenold KN (2007) Endemism and local rarity in birds of neotropical montane rainforest. Biological Conservation 138 : 453–463. http://doi.org/10.1016/j.biocon.2007.05.015

Kohlmann B (2011) Biodiversity conservation in Costa Rica—an animal and plant biodiversity atlas. In: Pavilnov I (Ed.) Research in Biodiversity: Models and applications. Intech, London, UK, 203–222. http://www.intechopen.com/books/research-in-biodiversity-models-and- applications/biodiversity-conservation-in-costa-rica-an-animal-and-plant-biodiversity-atlas.

Komar O (2002) Birds of Montecristo National Park, El Salvador. Ornitologia Neotropical 13: 167–193.

Kroodsma DE, Brewer D (2020) Ochraceous Wren (*Troglodytes ochraceus*), version 1.0. In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Birds of the world. Cornell Lab of Ornithology, Ithaca, USA. https://doi.org/10.2173/bow.ochwre1.01. Accessed between: 2019-06-01 and 2020-09-15.

Kroodsma DE, Brewer D, Greeney HF (2020) Isthmian Wren (*Cantorchilus elutus*), version 1.0. In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Birds of the world. Cornell Lab of Ornithology, Ithaca, USA. https://doi.org/10.2173/bow.istwre1.01. Accessed between: 2019-06-01 and 2020-09-15.

Lane D (2001a) XC65665 Bare-shanked Screech Owl *Megascops clarkii*. www.xeno-canto.org/65665.

Lane D (2001b) XC257038 Striped Owl *Pseudoscops clamator*. www.xeno-canto.org/257038.

Macaulay Library at the Cornell Lab of Ornithology (2021) https://www.macaulaylibrary.org/.

Martin TE, Blackburn GA, Simcox W (2010) An assessment of the effectiveness of two methods in describing a neotropical cloud forest bird community. Ornitologia Neotropical 21: 131–147.

Nelson M (2014a) XC166438 Mottled Owl *Strix virgata*. www.xeno-canto.org/166438.

Nelson M (2014b) XC166218 Unspotted Saw-whet Owl *Aegolius ridgwayi*. www.xeno-canto.org/166218.

Noernberg T (2011) XC103388 Tropical Screech Owl *Megascops choliba*. www.xeno-canto.org/103388.

O'Brien TG, Kinnaird MF (2008) A picture is worth a thousand words: the application of camera trapping to the study of birds. Bird Conservation International 18: S144–S162. https://doi.org/10.1017/S0959270908000348

Oostra V, Gomes LGL, Nijman V (2008) Implications of deforestation for the abundance of restricted-range bird species in a Costa Rican cloud-forest. Bird Conservation International 18: 11–19. http://doi.org/10.1017/S0959270908000038

Paradis ED (2007) A survey of tropical owl population density and the vocal behavior of the Mottled Owl (*Strix virgata*) in a partially fragmented cloud forest habitat. Cloudbridge Nature Reserve, San Gerardo de Rivas, Costa Rica, 6 pp. http://cloudbridge.org/wp-content/uploads/2011/11/a-survey-of-tropical-owl-population-density-vocal-behavior-mottled-owl.pdf.

Quesada-Monge R (2007) Los bosques de Costa Rica. IX Congreso Nacional de Ciencias: Exploraciones fuera y dentro del aula, Instituto Tecnológico de Costa Rica, Cartago, Costa Rica, 24–25 August.

Ramírez Alán O (2014) XC169822 Striped Owl *Pseudoscops clamator*. www.xeno-canto.org/169822.

Ray DK (2013) Tropical montane cloud forests. In: Pielke RA (Ed.) Climate vulnerability, volume 5. Academic Press, New York, USA, 79–85. https://doi.org/10.1016/B978-0-12-384703-4.00519-0

Remsen JV Jr. (2019) Buff-throated Foliage-gleaner (*Automolus ochrolaemus*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Handbook of the birds of the world alive. Lynx Edicions, Barcelona, Spain. https://www.hbw.com/node/56571. Accessed on: 2019-09-13.

Rising JD, Jaramillo A (2020) Sooty-faced Finch (*Arremon crassirostris*), version 1.0. In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Birds of the world. Cornell Lab of Ornithology, Ithaca, USA. https://doi.org/10.2173/bow.soffin1.01

Roncal CM, Middendorf E, Forsyth A, Cáceres A, Blake JG, Almeyda Zambrano AM, Broadbent EN (2019) Assemblage structure and dynamics of terrestrial birds in the southwest Amazon: a camera-trap case study. Journal of Field Ornithology 90(3): 203-214. https://doi.org/10.1111/jofo.12299

Rosero-Bixby L, Palloni A (1998) Population and deforestation in Costa Rica. Population and Environment 20 (2): 149–185. https://doi.org/10.1023/A:1023319327838

Sáenz-Bolaños C, Fuller TK, Carrillo J. E (2020) Wildlife diversity and relative abundance among a variety of adjacent protected areas in the northern Talamanca mountains of Costa Rica. Diversity 12 (4): 134. https://doi.org/10.3390/d12040134

Santos-Moreno A, Pérez-Irineo G, Ventura-Cristóbal E (2019) Diversity of understory birds in a perennial tropical forest at Los Chimalapas, Mexico. The Wilson Journal of Ornithology 131 (3): 606–614. https://doi.org/10.1676/18-182

Şekercioğlu CH, Mendenhall CD, Oviedo-Brenes F, Horns JJ, Ehrlich PR, Daily GC (2019) Long-term declines in bird populations in tropical agricultural countryside. Proceedings of the National Academy of Sciences May 2019 116 (20): 9903–9912. https://doi.org/10.1073/pnas.1802732116

SINAC (2020) Parque Nacional Tapantí Macizo de la Muerte. http://www.sinac.go.cr/ES/ac/accvc/pntpmm/Paginas/default.aspx. Accessed on: 2020-10-05.

Stiles FG, Skutch AF (1989) A guide to the birds of Costa Rica. Cornell University Press, Ithaca, USA, 511 pp.

Spencer A (2011a) XC72493 Costa Rican Pygmy Owl *Glaucidium costaricanum*. www.xeno-canto.org/72493.

Spencer A (2011b) XC72323 Costa Rican Pygmy Owl *Glaucidium costaricanum*. www.xeno-canto.org/72323.

Spencer A (2009) XC31765 Bare-shanked Screech Owl *Megascops clarkii*. www.xeno-canto.org/31765.

Team e-Bird (2019) 2019 eBird taxonomy update – complete. https://ebird.org/news/2019-ebird-taxonomy-update. Accessed on: 2019-09-20.

Thornton DH, Branch LC, Sunquist ME (2012) Response of large galliforms and tinamous (Cracidae, Phasianidae, Tinamidae) to habitat loss and fragmentation in northern Guatemala. Oryx 46 (4): 567–576. https://doi.org/10.1017/S0030605311001451.

Weller AA (2020) Snowy-bellied Hummingbird (*Amazilla edward*), version 1.0. In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E (Eds.) Birds of the world. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.snbhum1.01. Accessed between: 2019-06-01 and 2020-09-15.

Xeno-Canto Foundation (2005–2019) https://www.xeno-canto.org/. Accessed on: 2016-02-22.